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NUMBER 1

SOME RACIAL CHARACTERISTICS OF THE SPLEEN WEIGHT IN MAN

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This is the first of a series of studies on the weights of the internal organs in men of different races. The material used consists of post mortem records from the Charity Hospital and Touro Infirmary, New Orleans, La., the Johns Hopkins Hospital, Baltimore, Md., the University of Virginia Hospital, Charlottesville, Va., and other institutions; and the authors wish to thank Dr. Duvall, Dr. Landfried, Dr. Winternitz, and Dr. Marshall for their courtesy in permitting the use of the records from their laboratories. The spleens of 1,341 white men, 1,338 negro men, 441 white women and 554 negro women are utilized in the present study. The weights of all the spleens, normal and abnormal, will be given first, and then an attempt will be made to select only normal organs.

THE TOTAL SPLEEN WEIGHT. PERCENTAGES

Race-sex	Below 150 Grams	150-300 Grams	Above 300 Grams
White male.....	34.1	45.2	20.7
Negro male.....	52.3	37.1	10.6
White female.....	46.1	40.7	13.2
Negro female.....	70.4	25.1	4.5

It is evident that the white spleens are larger than the negro and the male larger than the female. The racial difference is more pronounced in the females than in the males.

The spleen weight in each sex-race group was examined for certain diseases in the same manner as for the total spleen weight. The following diseases were taken separately, tuberculosis, syphilis, carcinoma, acute lobar pneumonia, acute infections, chronic nephritis and carditis, chronic carditis alone, and cirrhosis of the liver; then the remainder of the spleens were put in a separate group. In each of these groups the same race and sex differences were found as in the total spleen weight.

THE NORMAL SPLEEN WEIGHT

After this had been done an attempt to determine the true normal spleen weight was undertaken. Every accident case or record of sudden death was scrutinized carefully and only those were selected as normal where no infection had supervened, and where no record was given of any pathological condition involving the spleen. Only 26 spleens of white men, 23 of negro men, 15 of white women and 7 of negro women were found that seemed to be normal. A list of these is given at the end with the available data and the relation of the spleen weight to stature. No spleen weights are included where the individuals were below the age of 22 years or above the age of 75 years and no spleen is included where the weight exceeds 250 grams. A table of the normal spleen weight follows:

THE NORMAL SPLEEN WEIGHT. PERCENTAGES

Race-sex	50-100 Grams	100-150 Grams	150-200 Grams	200-250 Grams
White males	19.2	30.8	42.3	7.7
Negro males	30.4	52.2	13.0	4.4
White females	13.3	40.0	40.0	6.7
Negro females	71.4	28.6		

The spleens of the white men are grouped about 150 grams and those of the negro men about 100 grams. The spleen weights of the women are somewhat lower than those of the men, as is to be expected. The difference between the spleen weights of the white women and the negro women is greater than in the case of the men, both absolutely and relatively.

The average spleen weight of the white men is 140.0 grams, that of the white women 128.0 grams, that of the negro men 113.5 grams, and that of the negro women 78.6 grams. The extreme spleen weights of the white men are 60 and 250 grams, of the negro men 80 and 200

grams, of the white women 60 and 200 grams and of the negro women 60 and 120 grams.

The weight of the spleen in relation to stature was found to be similar to the actual spleen weight and is given as follows:

RATIO OF SPLEEN WEIGHT TO STATURE. PERCENTAGES

Race-sex	Below 50	50 to 75	75 to 100	Above 100
White male.....	12.0	28.0	52.0	8.0
Negro male.....	4.6	63.6	27.2	4.6
White female.....	7.7	46.1	23.1	23.1
Negro female.....	66.6	16.7	16.7	

The average ratio of the white male is 81.8, of the white female 81.5, of the negro male 70.8 and of the negro female 48.3. The sexual difference is not great for the white, therefore the spleen varies more by stature than by sex. This cannot be said of the negro, although the number of ratios (6) for the negro female is too small for comparison. Practically all of the individuals are well nourished; therefore the condition of nourishment can have little or nothing to do with the difference in spleen weight. The individuals of the different groups are fairly well distributed through the age periods; therefore the age has little if any effect on the spleen weight, in these groups. The spleen decreases in size with advancing age, and there are a few more old among the negroes. This should make the spleens smaller among the whites than among the negroes, but the reverse is true; therefore this but emphasizes the racial difference.

DISCUSSION

It would be futile to attempt to determine the normal weight of the spleen from the published records and references we have been able to find because so many abnormal spleens are included in all of them, and the records are so much at variance with each other. Moynihan¹ gives the weight of the adult human spleen in England as 150 grams, which is larger than we found for the white male, but is probably about correct. Vierordt² gives the weight of 60 spleens of white males at the age of 24-25 years as 167.8 grams, and this may be

¹ Moynihan, B. G. A. Surgery of the spleen. In Keene's Surgery, 1908, III, 1068.

² Vierordt, H. Anatomische, physiologische und pathologische Daten und Tabellen. 1908.

DETAILED DATA ON THE WEIGHT OF THE SPLEEN IN INDIVIDUALS IN WHOM THE
ORGAN MIGHT BE CONSIDERED NORMAL

No.	Age	State of Nourish- ment	Stature, Cm.	Spleen Weight, Gr.	Ratio of Spleen Weight to Stature	Causes of Death
<i>White Male</i>						
<i>Johns Hopkins Hospital:</i>						
4812	40	Good	184	60	32.6	Mercuric chloride poisoning, edema of glottis, larynx, cesophagus; hemorrhage; gastroenteritis.
1489	40	Good	176	190	108.0	Fractured fibula; fat embolism of lungs.
1383	32	Good	156	150	96.0	Trauma; slight bronchopneumonia; bronchitis; myocarditis; cloudy swelling of kidneys; congenital defect of heart septum.
1480	39	Good	171	140	82.0	Trauma; meningitis; chronic pleurisy; (status epilepticus).
1422	30	Fat	172	200	116.3	Brain tumor; hemorrhage; tubercular scars in lungs.
2049	40	Thin	172	250	145.4	Brain tumor; bronchopneumonia.
2660	51	Good	173	120	69.4	Turpentine poisoning; acute gastritis and enteritis; congestion of kidneys.
2811	53	Thin	160	100	62.5	Fractured skull; cerebral hemorrhage; arterio-sclerosis.
2874	27	—	169	180	106.5	Ulcer of stomach; hemorrhage; infiltration of lungs; (clinical diagnosis: Tetanus).
3240	44	Thin	149	110	73.2	Edema of brain and lungs; sunstroke; chronic pleurisy; fatty liver; scoliosis.
3688	—	Good	179	150	83.8	Operation; tumor of hypophysis; acromegaly; chronic pleurisy; adenoma of adrenal; fibromata; adipose; edema of lungs.
<i>Charity Hospital, New Orleans, La.</i>						
130	40	Good	180	120	66.7	Multiple shotgun wounds chest and abdomen—general peritonitis.
214	35	Good	170	100	59.0	Compound comminuted fracture of skull—lacerated brain; chr. nephritis.
431	33	Good	157	90	57.3	Hemorrhage into peritoneum and pleural cavity—gunshot wound liver, lungs, and inferior vena cava; fracture of spine.
52	—	Good	174	185	106.0	Gunshot wound head—edema lungs; acute nephritis.

DETAILED DATA ON THE WEIGHT OF THE SPLEEN IN INDIVIDUALS IN WHOM THE ORIGIN MIGHT BE CONSIDERED NORMAL—*Continued*

No.	Age	State of Nourishment	Stature, Cm.	Spleen Weight, Gr.	Ratio of Spleen Weight to Stature	Causes of Death
353	40	Good	165	70	42.4	Fracture mandible; cerebral hemorrhage; multiple fracture ribs; fracture sacrum; fracture both legs; laceration face; ruptured kidney and liver.
387	45	Good	170	80	47.0	Acute poisoning.
123	32	Good	175	185	105.6	Mercuric chloride poisoning; acute enteritis and nephritis.
'17—146	72	Thin	168	150	89.3	Shock-hemorrhage; chronic interstitial nephritis; tubercular kidney; myocraditis.
'17—277	57	Good	174	150	86.3	Edema lungs superinduced by fracture of 2 ribs; fibrinous pleurisy; chronic interstitial nephritis; two aneurisms of aorta.
'17—156	—	Good	160	130	81.3	Carbolic acid poisoning.
'17—320	71	Good	170	180	106.0	Cerebral hemorrhage; fracture of vault.
'17—340	59	Good	167	140	83.8	Hemorrhage mesenteric artery; diffuse peritonitis; chronic interstitial nephritis.
'18—13	—	Good	170	85	50.0	Acute gastritis (cause unknown)
'18—92	—	Good	170	150	88.3	Fracture of skull; cerebral hemorrhage; fracture 2d to 12th left ribs; laceration of left lung; hemorrhages.
<i>Touro Infirmary, New Orleans, La.</i>						
'10—22	—	Obese	—	180		Vagus paralysis; alcoholism; fatty liver; edema of brain.

Colored Male

<i>Johns Hopkins Hospital, Baltimore, Md.</i>						
1930	50	Good	180	150	83.3	No cause for death found; no pathological lesion found; (clinical diagnosis: alcoholism; tabes dorsalis).
2834	52	Good	170	120	70.6	Trauma; broken spine; compression of spinal cord; paralysis; infarct of lung.
3539	40	Good	173	90	52.0	No cause for death found; no pathological diagnosis; operation for prostatectomy.
4224	40	Good	—	100		Burns; pharyngitis and laryngitis; bronchopneumonia; cloudy swelling of viscera.
<i>Charity Hospital, New Orleans, La.</i>						
'14—78	30	Good	168	85	50.6	Burns, 1st and 2d degree.
'14—310	—	Good	163	135	82.8	Hemorrhage of pons into 4th and lateral ventricles; acute nephritis.

DETAILED DATA ON THE WEIGHT OF THE SPLEEN IN INDIVIDUALS IN WHOM THE ORGAN MIGHT BE CONSIDERED NORMAL—*Continued*

No.	Age	State of Nourishment	Stature, Cm.	Spleen Weight, Gr.	Ratio of Spleen Weight to Stature	Cause of Death
'15—213	39	Good	170	110	84.8	Gunshot wound of liver, colon, right renal vein; retroperitoneal hemorrhage; chronic miliary tuberculosis of lungs.
'15—224	—	Good	170	80	46.0	Fractured skull; hemorrhage.
<i>Charity Hospital, New Orleans, La.</i>						
'16—34	22	Good	165	105	63.6	Acute anæmia; acute nephritis; compound fracture right tibia and fibula.
'16—194	23	Good	155	156	100.5	Tumor base of brain; local meningitis; oedema of lungs.
'16—297	23	Good	160	110	68.8	Surgical shock.
'16—308	—	Good	160	90	56.2	Cerebral hemorrhage; concussion; contusion; fractures 5th to 10th ribs; fracture left leg.
'16—343	—	Good	165	100	60.7	Cerebral hemorrhage; subdural clot.
'16—375	24	Good	165	110	66.8	Gunshot wound left arm and mediastinum; perforation of left lung; hæmothorax.
'17—13	24	Good	160	110	68.8	Paralysis; subluxation 6th cervical vertebra; laceration of cord; hemorrhage into spinal canal.
'17—35	58	Good	165	120	72.8	Subdural and intracortical hemorrhages, probably traumatic; chronic diffuse nephritis.
'17—103	48	Good	163	200	122.5	Gunshot wound in head; meningitis.
'17—108	24	Good	175	170	97.5	Gunshot wound in abdomen and neck hemorrhage.
'17—121	24	Good	171	140	82.0	Fracture base of cranium; cerebral hemorrhage.
'18—91	25	Good	155	100	64.5	Shock; trauma lower abdomen; cedema and congestion of lungs; aortic and mitral stenosis.
'14—101	27	Thin	175	95	54.3	Gunshot wound of intestine; septic pneumonia; septic pleurisy.
<i>University of Virginia Hospital</i>						
139	—	—	175	100	57.2	Gunshot wound of heart, liver, stomach, pancreas, and kidney; bronchopneumonia; beginning peritonitis.
175	35	—	158	80	50.6	Ruptured aneurism of the aorta; arterio-sclerosis of aorta.
<i>White Female</i>						
<i>Johns Hopkins Hospital:</i>						
1801	24	—	150	100	66.7	Perforated uterus; cystitis; thrombosis of vaginal veins; embolism of pulmonary artery.

DETAILED DATA ON THE WEIGHT OF THE SPLEEN IN INDIVIDUALS IN WHOM THE ORGAN MIGHT BE CONSIDERED NORMAL—*Continued*

No.	Age	State of Nourishment	Stature, Cm.	Spleen Weight, Gr.	Ratio of Spleen Weight to Stature	Causes of Death
1794	38	Emac.	—	150	—	Puerperal uterus; rupture; hemorrhage; anæmia; bicornate uterus; vaginal septum.
2278	23	Good	161	150	93.2	Tumor of brain.
1936	43	Good	171	200	117.0	Operation for myoma of uterus; thrombosis of left ovarian vein; embolism right pulmonary artery.
3138	30	Good	163	180	110.0	Cerebral tumor; œdema of lungs; cystic ovary.
4686	42	Good	150	60	40.0	Operation; strangulated inguinal hernia; congenital distension of ileum, proximal portion; cystic ovary.
5183	34	—	150	160	106.6	Undetermined; bronchopneumonia.
<i>Charity Hospital:</i>						
'14—354	46	Good	122	100	82.0	Fracture of vault; subdural hemorrhage.
'14—426	37	Good	—	160	—	Multiple fracture of pelvis; cellulitis; fracture of skull and right thorax (multiple).
'15— 10	29	Good	145	160	110.3	Multiple fracture of skull and face; lacerations of brain; rupture of liver, kidney, and lung; multiple fracture of pelvis; fatty liver.
'15—261	30	Good	164	110	67.1	Narcosis; œdema of lungs; acute parenchymatous nephritis.
'16—293	64	Good	150	110	73.4	Infarct of heart; myocarditis.
'17— 89	—	Good	153	100	65.5	Intestinal obstruction; gangrene lower ileum.
2897	60	Good	140	85	60.7	Acute arsenic poisoning; interstitial nephritis; hypertrophy and dilatation of heart; fatty liver and heart.
<i>University of Virginia Hospital:</i>						
182	24	—	100	100	66.7	Infarct of brain; congestion of kidney; fatty liver; pleural adhesions; atrophied ovaries.

Colored Female

<i>Charity Hospital:</i>						
'17—122	49	Thin	150	120	80.0	Paraplegia; congestion and œdema of brain; arteriosclerosis.
'17—216	50	Good	174	60	34.5	Interstitial nephritis; arteriosclerosis; post operative shock.
2180	37	Good	173	78	45.0	Pancreatitis; hysterectomy; hemorrhage; fatty liver; chronic parenchymatous nephritis; œdema of lungs.

DETAILED DATA ON THE WEIGHT OF THE SPLEEN IN INDIVIDUALS IN WHOM THE ORIGIN MIGHT BE CONSIDERED NORMAL—*Continued*

No.	Age	State of Nourishment	Stature, Cm.	Spleen Weight, Gr.	Ratio of Spleen Weight to Stature	Causes of Death
<i>Johns Hopkins Hospital:</i> 1596	51	Good	159	80	50.2	Brain tumor; gall stones; jaundice; cloudy swelling of kidneys; myoma of uterus; angioma of liver.
1737	24	Good	154	60	39.0	Intestinal obstruction; peritonitis; operation, hemorrhage.
3401	23	Obese	—	100	—	Tumor of brain, operation; fatty liver; ovarian cysts; tuberculous lymphadenitis; persistent thymus.
5062	—	—	159	65	40.8	Sudden death 24 hours after delivery; puerperal uterus; maceration.

the normal weight for the spleen of the German. Radasch³ gives the weight as 165 to 195 grams, and the textbooks of anatomy give the weight anywhere from 150 to 200 grams. All these weights are too high even for the white male of our series.

The only reference we have found to the weight of any negro spleens is that of Castor⁴ on the East Indians and Africans, and these are evidently "topical spleens" enlarged by such tropical diseases as malaria, dengue, etc., because they range from 250 to 400 grams. The weight of the African spleen is given as 340 grams for the male and 198 grams for the female. It may be mentioned incidentally that in this particular study the spleen was the only organ found to be larger in the colored than in the white races.

CONCLUSIONS

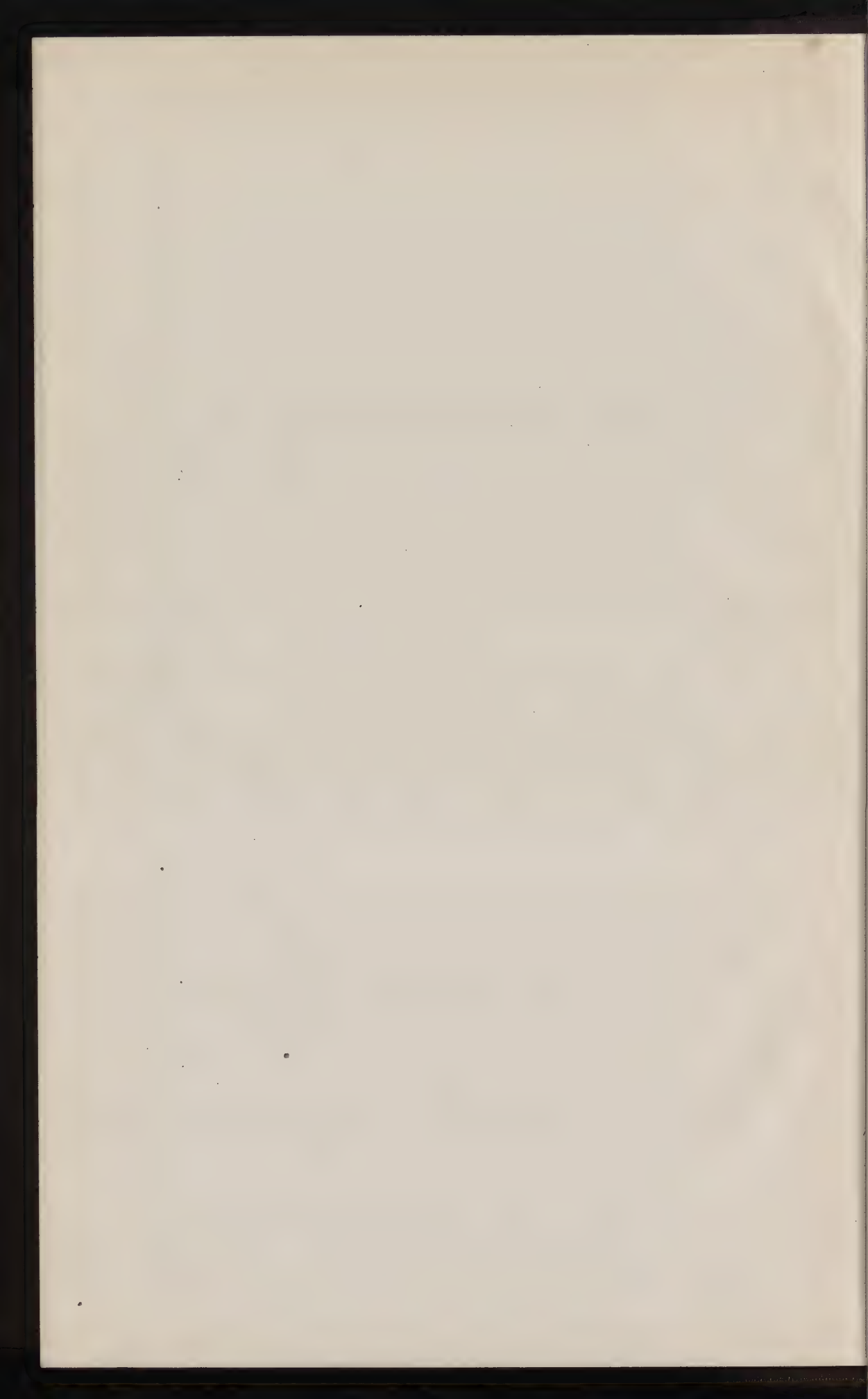
The spleen of the negro is smaller than that of the white, and this difference is well marked in both normal and pathological spleens.

The white male spleen weighs on the average about 140 grams, the negro male 115 grams, the white female 130 grams and the negro female 80 grams, although the number of normal spleens is too few to justify this as final.

³ Radasch, H. E. Spleen, Anatomy of. Reference Handbook of the Medical Sciences. 1917.

⁴ Castor, Lieut. Col. R. H. Weights of Organs. *J. Trop. Med. & Hyg.*, 1912, xv, No. 2.

In the pathological spleens the racial difference is even greater, in spite of the fact that more tall, young, well nourished negroes and more small, old, thin whites constitute the records; and this difference is especially noticeable between the males. This would seem to indicate that the whites are more viable than the negroes, and the large size of the spleen in the whites may play a part in this greater viability, especially when we consider that the spleen reacts to infections, and plays an important part in the resistance of the body to disease.



THE HAIR COLOR OF THE ITALIANS

FRANZ BOAS

In the last number of this JOURNAL (p. 415 *et seq.*) I have discussed the hair color of the Swedes according to a method which allows us to express the approximate amount of pigmentation by numerical values.

In the following pages I give the corresponding results for Italy. These have been derived from Table II (pp. 188 *et seq.*) of Livi's "Antropometria Militare." Since the classification of pigmentation in Sweden and Italy is presumably not the same, the results for these two countries must not be considered as comparable.

The pigmentation of the hair in Italy is least in the German communes south of Trient near Vicenza. The whole Trentino appears as a southward extension of the slightly pigmented northern type, which is due to the numerous German element in this whole district. The pigmentation increases very rapidly southward and reaches a maximum in the neighborhood of the Po, although light colors prevail in the upper Po valley. The color of the hair in Tuscany is lighter than in the country to the north and to the east, but the whole peninsula southward to a line running from Monte Gargano to Rome is very uniform in pigmentation. From here on the darkness of the hair increases rapidly towards southern Calabria, and decreases again in Sicily from east to west.

These facts appear also on the Livi maps of the distribution of dark and light types (pp. 6-9 of the Atlas).

The variability of pigmentation reaches a maximum in a district extending from Udine to Ravenna and westward up the Po valley, including the valley of the Dora Baltea. A minimum is found along the east coast running from Potenza and Barletta towards Macerata. A second maximum is found inland from Naples in the region between Potenza and Benevento.

The reasons which account for the high variability in this area are not easily understood. The fact that the greatest variabilities are

were distinguished, and the classification were made more rigid by the selection of definite samples according to which the pigmentation



FIG. 2.—Variability of pigmentation of hair in Italy.

were classified. In this case it would also be possible to determine objectively the amount of pigmentation to be ascribed to each group.

AVERAGES AND VARIABILITIES OF HAIR COLORS OF ITALIANS

	Average	Variability		Average	Variability
Alessandria	— .310	.533	Massa	— .359	.532
Cuneo	— .390	.499	Pisa	— .297	.512
Novara	— .383	.552	Siena	— .330	.486
Torino	— .455	.525	Ancona	— .265	.513
Genova	— .350	.521	Ascoli Piceno	— .271	.473
Porto Maurizio	— .350	.531	Macerata	— .282	.504
Bergamo	— .337	.490	Pesaro	— .277	.525
Brescia	— .315	.499	Perugia	— .278	.539
Como	— .423	.527	Roma	— .233	.507
Cremona	— .286	.534	Aquila	— .258	.500
Mantova	— .207	.561	Campobasso	— .256	.486
Milano	— .354	.527	Chieti	— .241	.483
Pavia	— .278	.563	Teramo	— .257	.516
Sondrio	— .431	.456	Avellino	— .243	.553
Belluno	— .418	.522	Benevento	— .197	.593
Padova	— .321	.553	Caserta	— .188	.528
Rovigo	— .284	.546	Napoli	— .198	.533
Treviso	— .343	.526	Salerno	— .201	.505
Udine	— .400	.558	Bari	— .151	.543
Venezia	— .358	.562	Foggia	— .243	.476
Verona	— .326	.556	Lecce	— .167	.518
Vicenza	— .528	.545	Potenza	— .184	.490
Bologna	— .275	.498	Catanzaro	— .078	.508
Ferrara	— .214	.536	Cosenza	— .114	.522
Forlì	— .181	.507	Reggio Calabria	— .032	.510
Modena	— .221	.512	Caltanissetta	— .194	.495
Parma	— .290	.503	Catania	— .135	.510
Piacenza	— .207	.526	Girgenti	— .170	.508
Ravenna	— .302	.491	Messina	— .092	.525
Reggio Emilia	— .253	.552	Palermo	— .165	.531
Arezzo	— .346	.514	Siracusa	— .140	.488
Firenze	— .353	.516	Trapani	— .193	.529
Grosseto	— .321	.499	Cagliari	+ .096	.485
Livorno	— .243	.541	Sassari	— .040	.494
Lucca	— .221	.524			

INHERITANCE OF EYE-COLOR IN MAN

HELENE M. BOAS

It has been claimed that human eye-color is inherited as a unit character according to Mendel's law and that brown eyes are dominant over blue. Davenport¹ and Hurst² have given the most extensive data intended to prove this point.

Davenport gives eye-color of grandparents, parents, and children of twenty-eight families and considers the data sufficient evidence that brown eyes behave as dominant over blue and grey eyes. Further he claims that grey eyes are dominant in blue-grey matings. These conclusions are not convincing because the investigator has been forced to substitute a hypothetical eye-color for the color actually recorded or to "doubt whether the term is used with precision" in order that his results may conform to the Mendelian formula. As an illustration of the method employed by Davenport we may consider the evidence he gives for recessiveness of blue eye-color. He states that in blue-blue matings sixty-nine of the offspring have blue eyes and six blue-grey or grey. In four families he says all the children are blue-eyed. In looking over the table, however, we see that of the sixty-nine blue-eyed offspring only forty are classed as blue-eyed without hypothesis or doubt as to the validity of the observations. Of the four families with three generations of blue eyes only, two have hypothetically blue eyes.

In the present study a new method, which requires data of only two generations—parents and children—has been used to test the Mendelian hypothesis for the inheritance of eye-color. Let us assume, as Davenport and Hurst have done, that brown eye-color is dominant over blue in the usual Mendelian sense. Classifying eyes as either blue or brown there are, of course, six possible matings: homozygous brown with homozygous brown, homozygous brown with heterozygous brown, heterozygous brown with heterozygous brown,

¹ Davenport, C. B. 1907. Heredity of Eye-color in man. *Science*, N. S., 26 : 589.

² Hurst, C. C. 1908. On the inheritance of eye-color in man. *Proc. Roy. Soc.*, 80: 85.

homozygous brown with blue, heterozygous brown with blue, and blue with blue. In order to test for Mendelian ratios those families only must be used in which blue-eyed children appear; that is the parents must both be either heterozygous brown-eyed, both blue-eyed, or one heterozygous brown-eyed and the other blue-eyed. Although in the population there will also be families with only brown-eyed children, as a result of heterozygous matings, these cannot be used, since there is no way of judging whether they are of heterozygous or homozygous origin. As soon as homozygous brown are included the distribution of eye-color will depend on the composition of the population. We cannot obtain the 3 : 1 ratio typical for Mendelian inheritance in heterozygous brown-brown matings, when we include in our data families with only brown-eyed children, because many of these will be of homozygous origin. The larger the number of families of homozygous origin included, the more the ratio will be disturbed. The same, of course, holds true in heterozygous brown-blue matings, where the typical 50 : 50 ratio would not be obtained if brown-eyed children of homozygous origin were included. For this reason it is necessary to exclude all families with only brown-eyed children.

TABLE I
DISTRIBUTION OF EYE-COLOR AMONG BOHEMIANS *in per Cent*

Observers	Eyes, Color					Total		Total Number of Observations
	Brown	Brown-grey	Grey	Blue-grey	Blue	Brown	Blue	
MF.....	48	—	13	—	39	61	39	237
MJ.....	41	1	15	2	41	57	43	528
TM.....	58	—	7	—	35	65	35	259
G.....	66	—	4	—	30	70	30	358
B.....	41	13	1	13 ¹	32	55	45	599
MB.....	48	—	23	—	29	71	29	456

I have analyzed three different populations, Italians, Bohemians, and East European Jews from this point of view. The material was collected in New York in 1908-09 in connection with work for the Immigration Commission. The observers were the same in all three cases. The accompanying tables (Tables I and II) show that the classification as to the color of the eyes is consistent and further that it is

¹ In this case it might be better to include blue-grey with brown. However the number of families which could be used for determining the probability for the occurrence of blue-grey eye-color was so small that the classification does not influence the result.

justifiable to class grey and brown-grey eyes with brown, and blue-grey with blue. Among the Italians the percentage of brown eyes is so great that it is not necessary to list the observations for the whole population, as has been done for the Bohemians and Jews.

TABLE II
DISTRIBUTION OF EYE-COLOR AMONG EAST EUROPEAN JEWS *in per Cent*

Observers	Eyes, Color					Total		Total Number of Observations
	Brown	Brown-grey	Grey	Blue-grey	Blue	Brown	Blue	
L.....	40	7	29	5	18	76	23	156
MF.....	66	—	13	—	21	79	21	356
SF.....	68	—	14	—	14	82	14	46
F.....	62	—	9	—	29	73	29	345
F. & Rap.	87	—	7	—	7	94	7	56
R.....	67	—	17	—	17	84	17	93
S.....	65	—	19	—	15	84	15	1440

If for one particular type of mating p represents the probability for brown eyes and q for blue eyes and n the number of children in a family; then nq will represent the average number of blue-eyed children per family. To test the theory we must however, as has been explained above, exclude families with only brown-eyed children. The probability that in a family with n children all will have brown eyes is p^n , therefore excluding these, $n(1 - p^n)$ will be the total number of children in the population. Consequently the probability for blue eyes in the whole series will be $\frac{nq}{n(1 - p^n)}$ or $\frac{1 - p}{1 - p^n}$.

In heterozygous brown-brown matings p for the whole population equals $3/4$. In families of two children p^n would equal $(3/4)^2$ and $\frac{1 - p}{1 - p^n}$, the value wanted in order to test the theory, would equal $\frac{1 - 3/4}{1 - 9/16}$. We thus obtain the following series of theoretical values on the assumption that we are dealing with Mendelian inheritance of a single unit factor:

n	2	3	4	5	6	7	8
$\frac{1 - p}{1 - p^n}$	57	43	37	33	30	29	28

The following tables III and IV give, in per cent, the actual observed values for blue eyes.

TABLE III
HETEROZYGOUS BROWN \times HETEROZYGOUS BROWN
Per Cent of Brown

<i>n</i>	2	3	4	5	6	7	8
Theoretical.....	57	43	37	33	30	29	28
Observed:							
Jews.....	50	52	36	25	16	14	—
Bohemians.....	68	42	43	30	—	29	—
Italians.....	70	43	25	36	17	—	—
Hurst.....	50	33	25	40	27	—	33

TABLE IV
HETEROZYGOUS BROWN \times BLUE
Per Cent of Brown

<i>n</i>	2	3	4	5	6	7	8	9
Theoretical.....	67	57	53	52	51	50	50	50
Observed:								
Jews.....	59	60	72	40	—	—	25	—
Bohemians.....	68	52	58	53	33	—	—	—
Italians.....	63	67	38	20	—	—	25	—
Hurst.....	56	56	56	56	54	43	63	51

Tables V and VI give the actual observed values for the different populations. At the foot of the tables are given the total percentage of brown eye-color resulting when the four different populations are combined, and for comparison the theoretical values on the assumption of Mendelian inheritance. As will be seen from the tables the totals are calculated by dividing the total number of cases of blue eyes in each column, numerator of the fraction, by the total number of children recorded, denominator.

TABLE V
HETEROZYGOUS BROWN \times HETEROZYGOUS BROWN
Observed Values

<i>n</i>	2	3	4	5	6	7	8
Jews.....	10/20	22/42	13/36	5/20	4/24	1/7	—
Bohemians.....	34/50	15/36	17/40	6/20	—	2/7	—
Italians.....	7/10	13/30	5/20	9/25	1/6	—	—
Hurst.....	1/2	2/6	3/12	2/5	8/48	—	2/8
Total.....	52/82	52/134	38/108	22/70	13/78	3/14	2/8
Per cent brown.....	65	39	35	32	17	21	25
Theoretical per cent.....	57	43	37	33	30	29	28

TABLE VI
HETEROZYGOUS BROWN \times BLUE
Observed Values

<i>n</i>	2	3	4	5	6	7	8	9
Jews.....	13/22	20/33	20/28	4/10	—	—	2/8	—
Bohemians.....	41/60	22/42	14/24	8/15	2/6	—	—	—
Italians.....	5/8	10/15	6/16	2/10	—	—	2/8	—
Hurst.....	9/16	10/18	18/32	25/45	29/54	12/28	5/8	23/45
Total.....	68/106	62/108	58/100	39/80	31/60	12/28	9/24	23/45
Per cent brown.....	64	57	58	45	52	43	38	51
Theoretical per cent.....	67	57	53	52	51	50	50	50

From these tables it might be argued, especially because of the rather small number of cases, that the observed values correspond fairly well with expected values for Mendelian inheritance. A few other points should, however, be taken into consideration. The following table, Table VII, gives the occurrence of brown eyes in blue-blue matings.

TABLE VII
BLUE \times BLUE
Observed Values

<i>n</i>	2	3	4	5	6	7
Jews.....	2/6	1/6	6/16	—	—	1/14
Bohemians.....	3/22	8/80	2/4	—	—	—
Italians.....	4/12	—	1/8	—	—	—
Hurst.....	0/12	0/6	0/12	0/5	0/6	0/14
Total.....	9/52	7/92	9/40	0/5	0/6	1/28
Per Cent blue.....	83	92	77	100	100	96
Theoretical per cent.....	100	100	100	100	100	100

There are here among the children of two blue-eyed parents 12 per cent with brown eyes. This might, of course, be due to an error in observation. The eyes of these parents may have had some brown and really belong to the brown-eyed class. If this is the case we must assume that the same error was made in the other matings and we might have up to 12 per cent more brown eyes than observed. This would bring the percentage of brown eyes much higher than should be the case in Mendelian inheritance.

From Table V it seems as though in families with two children the observed percentage of blue-eyed children is higher than should be expected in Mendelian inheritance of a unit factor, while for families

with a larger number of children it is too low. More material is necessary to determine whether this result is significant, or merely accidental. It might be possible, for instance, to assume that the ancestry had some influence on the eye-color of the children and not the immediate parents alone. In excluding families with only brown-eyed children, as has been done in this paper, a larger percentage of families with two children have been excluded than with more than two children. This may have brought about a selection so that the distribution of eye-color in the ancestry of the different groups is not alike.

It is not claimed that the data here presented prove or disprove the Mendelian inheritance of eye-color. An attempt has been made to show that the previous studies which have claimed Mendelian inheritance as a unit factor are unsatisfactory and a different method of treating such problems has been pointed out. This method has the advantage that only two generations are necessary, parents and children, and not, as generally, at least three generations in order to determine the homozygosity or heterozygosity of the parents.

THE "SAMAR" UNITED TWINS

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On the 31st of July, 1918, I had the opportunity of making a hasty and superficial examination of the so-called Samar Twins who until very recently have been exhibited at Coney Island. A satisfactory examination was made impossible by the fact that a legal controversy was in progress between the manager of the boys and the Brooklyn Society for the Prevention of Cruelty to Children. Mr. Arthur Towne, Superintendent of the Society, kindly gave me permission to make such observations as the twins would voluntarily submit to. To Mr. Towne I am also indebted for the privilege of studying the finger prints of the twins, for clippings concerning them and for much valuable and interesting information which is the result of his own observations.

The twins are boys aged ten years and were born on the Island of Samar, Philippine Islands. They are representatives of the Christian Bisayan linguistic stock and of the mixed Malay physical type. The only description of the twins of scientific interest so far as I am aware is that of Dr. R. M. Riggall, a British Naval Surgeon, published in the British Medical Journal of 1911. At the time of Dr. Riggall's examination (1910) the boys were 22 months old.

The boys, Simpicio and Lucio Godino, are identical twins, in which the fission has been incomplete. The bodies are entirely distinct except for a juncture of the right buttock of one of the twins with the left buttock of the other. "The most remarkable thing about them," in Dr. Riggall's words, "is the existence of a common anus. As far as I could tell by a rectal examination, the whole rectum is common." The genital organs are normal. The penis in each case is rather small but this is characteristic of their race. Their bodies are well developed and normal, perhaps being in a slightly better condition above than below the hips.

Mentally the boys are normal in every respect. They are active

and keen and show an intelligent interest in everything they see. They have evidently been well educated and have good command of the English language. Simplicio, the left twin, is right-handed and Lucio is left-handed.

The extreme activity of the boys made it very difficult to obtain satisfactory measurements. Their skin color is yellowish brown corresponding closely to numbers 22 and 23 of Von Luschan's skin color chart. The hair is black and straight. The eyes are a very dark brown in color and have the characteristic epicanthic fold. The nasal bridge is low and the nose is concave in profile. The point of the nose is short and thick and the long axes of the nostrils are directed transversely. Simplicio's ears are somewhat pointed and stand off from the head. Lucio's ears are more rounding and stand closer to the head. The upper incisor teeth were slightly concave on the lingual surface.

Standing at ease, Lucio, the left twin, is somewhat taller than Simplicio. From my brief acquaintance with the boys it seemed as if Lucio also showed a bit more of initiative and more often determined the course of action. In the attitude of attention very small differences were found in measurements of stature and its component elements. Following is a list of the more important measurements and proportions:

	Lucio Godino Right Twin Left-Handed	Simplicio Godino Left Twin Right-Handed
Stature.....	1,210	1,200
Arm reach.....	1,320	1,330
Sitting height.....	64.0 cm.	64.0 cm.
Head length.....	17.7	17.9
Head width.....	14.3	15.3
Breadth of face.....	13.0	13.5
Height of face (hair line).....	18.4	17.7
Height of face (nasion).....	10.4	9.9
Height of nose.....	4.3	4.1
Width of nose.....	3.5	3.4
Cephalic index.....	80.8	85.5
Cephalo-facial.....	90.9	88.2
Facial index (morphological).....	80.0	73.3
Nasal index.....	81.4	82.9
Arm reach index.....	109.0	110.0
Combined weight.....	112 pounds	

It will be noted that there are marked differences in the proportions of the head and face. Simplicio, the left twin, has a much broader



PLATE I.—The Samar Twins in 1918.

head and a much lower and wider face. The heads and faces of the boys are somewhat asymmetrical and distorted laterally to the right on the right twin and to the left on the left twin.

Morphologically the patterns of the finger prints are very similar on the two boys. However, the nuclei of the patterns are somewhat different in detail. The patterns are various types of vortices with the exception of the ulna loops on both little fingers of Lucio and on the left little finger of Simplicio. In detail, these vortices present a variety of patterns. The nuclei of the thumb prints do not correspond. On the left thumb of Lucio and on the right thumb of Simplicio the patterns are very similar, the nucleus being more or less of a series of concentric ellipses. On the left thumb of Simplicio the pattern might be termed a false vortex. On the right thumb of Lucio the pattern is a double spiral. The left forefinger of Simplicio presents a series of more or less concentric ellipses. Simplicio's right and both of Lucio's forefingers present double spirals. The right middle finger of both boys show a series of concentric ellipses. Simplicio's left middle finger presents a false vortex and Lucio's a double spiral. The right ring finger in each of the boys shows a series of concentric ellipses, while the left ring fingers have spiral patterns. As mentioned before, the little fingers have ulna loops with the exception of Simplicio's right which has a spiral pattern, opening, however, on the ulna side.

These identical twins show then minor differences in the configuration of the finger prints and rather marked differences in head and face proportions. The asymmetry of the heads and faces leads one to suspect strongly that these latter differences are due in part at least to external influences and developmental disturbances rather than to hereditary differences.

THE EFFECT OF THE WAR UPON THE AMERICAN CHILD

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The dysgenic effects of war have been discussed in the past and are increasingly a subject of paramount importance during the present period. In considering it, heretofore, emphasis has been laid upon the disastrous effects of wars through the killing off of the superior portion of the population; through their deleterious effects upon the fighting man, on the birth-rate, on the physical condition of the next and of following generations, and so on. The effect of war upon the civil population has been discussed in relation to the survival of the least fit through the choice for the army of the physically superior, and the handing down of inferior qualities to the next generation. The children have been considered with regard to illegitimacy, the birth-rate, infant mortality; with regard, that is, to their numerical quantity, the quality of those born, and their killing off or survival in early maturity.

What we are to consider here is principally the effect of the war just ended upon the present generation of children in America, upon those who were born, and those who passed their most formative years under the organization and during the pursuit of the greatest war in history. How has the struggle touched them, physically, educationally, emotionally? How has it affected them with regard to their qualities as future American citizens? The answer even now can be determined only in a general way, for the phrase "accurate statistics are not available" meets the inquirer at every turn. But there are various tendencies, movements, conditions, of which we know the common result, and viewing which we can deduce the probable nature of the effects. From practical experience gained in peace and from the war experiences of other countries, may be determined with a fair degree of certainty, the result of present conditions. For though hostilities have ended it is a fact that war conditions so far as children are concerned, largely continue.

"Belgian babies" is a phrase whose significance we are not likely to forget. The truth about Serbia and Poland would no doubt render even more indelible the realization of what war does to children. Even in the countries not invaded war has laid its hand heavily upon the younger generation, sending the children into premature employment, closing the schools, enlisting the teachers in war work, producing a notable increase in juvenile delinquency, and seriously endangering the health of growing children.

"Wars are not paid for in war time. The bill comes later," said Benjamin Franklin. We have already in a measure seen the truth of his assertion in America. The most far-reaching—the fundamental—effect of the extravagant waste of childhood of which we have evidence, is upon health. All other matters, even education, relate to health in the broadest sense. To produce a race of men who shall be sound in mind and body, we know that certain matters are essential—prohibition of child labor and prevention of juvenile crime on the negative side; on the positive, proper nourishment and education; on both sides, health, through constructive training and the prevention and cure of disease. To determine the effect of war upon health, then, it is necessary to consider briefly the matters effecting it.

The first immediate result of war in America was to relax child labor laws in four states, Connecticut, Massachusetts, New Hampshire, and Vermont, by the legislature granting power to the governor to suspend the labor laws. In Arizona, California, and New York power was granted likewise to suspend the compulsory education laws. In ten other states action was taken without legislation to suspend the school laws so that children might work. On the other hand, not as a result of war conditions, but rather in spite of them, four states have strengthened their child labor laws in 1918, and two states have made notable advances with regard to education. The federal child labor law which went into effect in the fall of 1917 and was declared invalid by the Supreme Court nine months later must be mentioned as an incident, though not in any respect a result of the war. The Children's Bureau through investigations conducted since the court's decision on June 3 has found notable increase in child employment in the states which did not have standards as high as the federal law. In these it is known that the return to the 9-, 10-, and 11-hour day for children has been general. So much with regard to conscious permissive relaxation of the laws.

When the schools closed in the summer of 1918 unprecedented numbers of children 14 to 16 years of age applied for permits to work under the various state laws. In Massachusetts the number amounted to 50,000. In Maryland up to October 17, over 15,000 children had applied for permits. In Wilmington, Del., 61 per cent more children took out working papers this year than last, and most of these were for full-time employment. In Washington, D. C., 1,095 certificates were issued to children 12 and 13 years of age under the clause exempting children of this age for poverty—an increase of 295 per cent over the number issued in 1916-17. In addition, the number of 14- to 16-year-old children employed in Washington increased 164 per cent. Washington's child labor problem, it is said, is not that of underpaid and poorly fed children toiling in factories, but rather that of well-fed and overpaid boys and girls doing light work. The problem is to prevent them from spending money in ways that will injure them. In New York City the total issuance of permits for vacation work alone was 6,336 during July and August. In the same time the number of regular permits issued was 3,245 greater than the year before.

The falling off in school attendance has been in direct relation to the increase in the number of children employed. High wages, the high cost of living, the desire on the part of the children for more active work, have all been factors in a great exodus from the upper grades of the public schools. An estimate based on reports from Philadelphia, Wilmington, St. Louis, Massachusetts, Rhode Island, and other states, places the increase over the normal number leaving school between 50 and 100 per cent. Truant officers in many localities are said to have been overworked in the effort to round up only those children that are out of school *illegally*.

The school situation was further complicated by the fact that, according to the Commissioner of Education, 40,000 more teachers have left the schools in 1918 than normally. The reason is not far to seek and may be given on the same authority: "It is very plain that we must practically double the salaries of teachers in the United States." The natural reluctance of young women to enter a profession in which after a long course of training they will receive less pay than in ordinary clerkships is evidenced in Philadelphia where 70 classes were excused for lack of teachers, and the School of Pedagogy closed for lack of applicants. In New York City alone there were at the end of the year 400 vacancies on the public school staff.

It is in the rural communities, however, that the teacher shortage was most critical. The U. S. Employment Service reports that 425 counties in 19 states had a shortage of 2,818 teachers. In some counties the superintendents reported that 35 per cent of their teachers were without previous experience, and it was concluded that probably 122,000 inexperienced teachers will be employed in rural communities this year (1919). For this situation the teachers could not be blamed. Ability was wanted in better paid fields and there ability did go.

The question of illegal employment is closely bound with the school problem. When schools are closed, when attendance officers are lax, new to the job, or non-existent, children too young to obtain permits will go to work without them, and older children will enter prohibited kinds of employment. Though naturally this was more difficult to trace than labor which falls within the letter of the law, still it, too, was evidently on the increase. An agent of the National Child Labor Committee recently was informed that boys 12, 13, and 14 years of age were working in the coal breakers at Wilkes-Barre and other mining towns and that night work was being done by boys 14 years old who applied by hundreds for jobs in the factories, claiming to be 16. Another common field for illegal work was in the street trades, such as newspaper selling. Increased illegal employment was apparently confined to no one district but appeared wherever opportunity, through the centralization of large industries, the closing of schools, or scarcity and laxness of enforcing officials made it possible.

While we can not yet give an authentic general statement covering the matter of child labor during the war throughout the United States, yet since in every locality so far studied the increase in this period has been more or less marked, reaching in some places a phenomenal proportion, it is very plain that the condition with few exceptions must have applied to the entire country.

Unfortunately no statistical comparison is available between the health of children in industry and those who have remained in school. We have no scientific basis for determining the effect of different kinds of work upon children. But it is common sense to assume that when adults get very tired on a ten-hour-day schedule, the same kind of work for the same number of hours must be damaging to the physical and probably also mental development of young boys and girls. We know that fatigue increases subjectiveness to disease and accident, and we know that exhaustion by fatigue comes to children sooner than to adults. A federal study on the causes of death among cotton mill

operatives ascertained that boys between 16 and 19, who made up one-sixth of all the male workers in the cotton mills, had a death rate nearly twice as high as the non-operative population of the same age.

The importance of the physical and mental changes that take place normally during the period between 12 and 18 can hardly be overestimated. Muscular exercise is essential to the child during adolescence; he will play, and play hard; and his nature will demand certain things that are, as a rule, exactly the opposite of those that the factory will exact. In factory work a muscle must perform its functions without relaxation for a long period of time. This produces fatigue and if carried on for long, results in degeneration, inducing postures which are abnormal and which tend to develop into deformity, such as flat-foot, round shoulders, and distortions of the spine and chest. The period of plasticity and adaptability will develop, under exploitation, into one of more or less retarded growth, lack of proper development of the unused muscles, and health disturbance. The Chief Medical Officer of the British Board of Education has described the effects of child labor as follows: "Many children pass through the strain of premature employment apparently uninjured. The physical injury which manifests itself is insidious and inconspicuous, but far-reaching."

Such in brief were the conditions in the United States during the year just past, and they almost duplicated, in spite of our Allies' patent warning, the experiences of England and the other uninvaded districts of the warring countries. In conjunction with them Europe experienced a large increase in juvenile delinquency. This was due, according to an English specialist, Cecil Leeson, to the increase in child employment and the high wages obtained, to the closing of many schools, the absence of fathers and the increased employment of mothers, to the loss of recreational and social facilities, and to the general atmosphere and emotional tension. So far as we are able to judge, there has not been such widespread increase in juvenile crime in this country. Large cities, such as Chicago, Denver, Cincinnati, Detroit, do report a growth in the number of children brought before the courts. But Brooklyn, Seattle, and Milwaukee report a decrease. In some other cities the figures are approximately the same for 1918 as for the year previous. Consequently on this point it is unwise to draw conclusions. Schools have not closed to such an extent as in England; the effect of conscription upon the homes did not have so long to show itself; though the number of working mothers has enormously increased, this, too, has not had time to show full results. Welfare agen-

cies have not to any great extent diminished their efforts, but in notable instances more is being done to-day in America than ever before. Probation is further advanced in the United States than in England. All these facts may have served to keep juvenile delinquency, so far, more or less stationary.

We have been concerned with the indirect effects of war upon the health of children. Directly America is concerned over the question of health as never before. The figures from the first army draft were a revelation of physical deficiency to the general public, showing as they did that about 30 per cent of our young men in the prime of life—the school children of yesterday—were physically unfit for military service. The fact that about one-third of these were rejected for preventable defects gave further point to the commentary on our national health. In this sense the war has had a beneficial result in showing up, quite simple and irrefutably, the need for constructive and preventive health work. Of the 20,000,000 school children of to-day, it is shown that 75 per cent have defects and ailments that impede normal development in greater or less degree, and that most of these defects and ailments are preventable if taken in time. Of New York school children in 1916, one-third were found to be in good condition; slightly over one-half were in but passable condition, while the remainder were on the borderland of serious impairment or required medical treatment.

Malnutrition was estimated to affect, on a conservative estimate, 10 per cent of New York children—before the war. To-day 21 per cent have dropped into the class of the undernourished. During the last year the high cost of living, while it has raised wages, at the same time luring many young children to work, has not raised them in proportion to the mounting cost, and has produced according to medical men a significant effect upon nutrition by lowering the scale of living. It can not be proved statistically that malnutrition is more widespread since the war, but it is reasonable to suppose that it must be. Food conservation, moreover, has taken away many foods that the foreign-born population was accustomed to, and which they do not readily replace.

On the other hand, public attention has been focused upon the causes and effects of malnutrition as never before, and increased preventive activity is the result. The Bureau of Education has taken up the matter of health work in the schools—not the formal teaching of hygiene so much as the attempt to formulate health habits in all

children of school age. Further, the awakened interest in health has resulted in a rapid growth in the school lunch system throughout the country. New York City has appropriated in 1918, \$50,000 for demonstration purposes and though figures are lacking, it may be stated that the movement has received a tremendous impetus all over the country due to the necessity brought about through the growth in malnutrition and the absence at work of mothers who would normally provide lunches at home.

Iowa has established the first child welfare Research Station with a yearly appropriation of \$25,000; the work is to cover heredity and prenatal care, nutrition, preventive medicine, social surveys, education and morals, and applied psychology. The Children's Bureau has undertaken an extensive program of work in the physical examination of children between birth and school age. Other government agencies have taken constructive measures. The War Labor Policies Board ruled that the standards of the federal child labor law of 1916 should be upheld in all government work—a ruling against which the cotton manufacturers made emphatic protest. Congress has just passed a new federal child labor law, placing a prohibitive tax upon child-made goods. In education the war department⁸ worked out a plan for schools in the large munition centers. The United States Boys' Working Reserve, organized under the U. S. Employment Service, has done particularly notable work in providing for boys over 16 years a healthful outlet for their desire for active service in food production, under supervision, and an opportunity to continue in school at the same time.

It may be concluded that a certain increased activity on the part of agencies and the public has, in part at least, offset the damaging effects of war conditions. We have dealt in generalities based upon certain factors whose existence, relative extent, and common results are known. We have seen that while child labor has increased within and without the law, the number of children in school has decreased, and that juvenile delinquency has shown a tendency to rise in many localities. These factors have had a damaging effect at the same time that health has been directly and adversely affected.

But there is another result of war—and this is its very intangible, subtle influence upon character through the heightening of emotional strain. Children in war time want to get into active work, as well as to dramatize and identify themselves with their elders. When fathers and brothers are in camp or at the front, when there is everywhere

the attendant excitement of war together with the call for more and more labor, the appeal to the child's desire to take his part in the world struggle—at all events to be doing something that seems to him more vital than sitting over a book—whether it be selling war stamps, working on a farm, or only blacking boots or exceeding the speed limit, is too strong to be resisted. The entrance into "business" has often been caused by the desire to earn money for War Savings Stamps, although the practice has been discouraged by campaign directors who are far-sighted enough to appreciate the obvious dangers.

One example may be given of this futile, if not actually dangerous form of activity. During May and June, 1918, on a busy square in a large eastern city, a little girl of six stood for two hours daily selling war savings stamps from a booth erected for her. There happened to be no city ordinance under which the child could be prohibited from what the noon heat, the continual strain of soliciting, and the publicity must have rendered an injurious occupation at best. Considerable pressure on the part of social agencies ultimately coincided with her removal. In the course of investigation it was found that the child was employed by a famous insurance company to sell the stamps in which the company had over-invested. Such was her appeal to the public that over \$12,000 of stamps were disposed of. Comment is unnecessary.

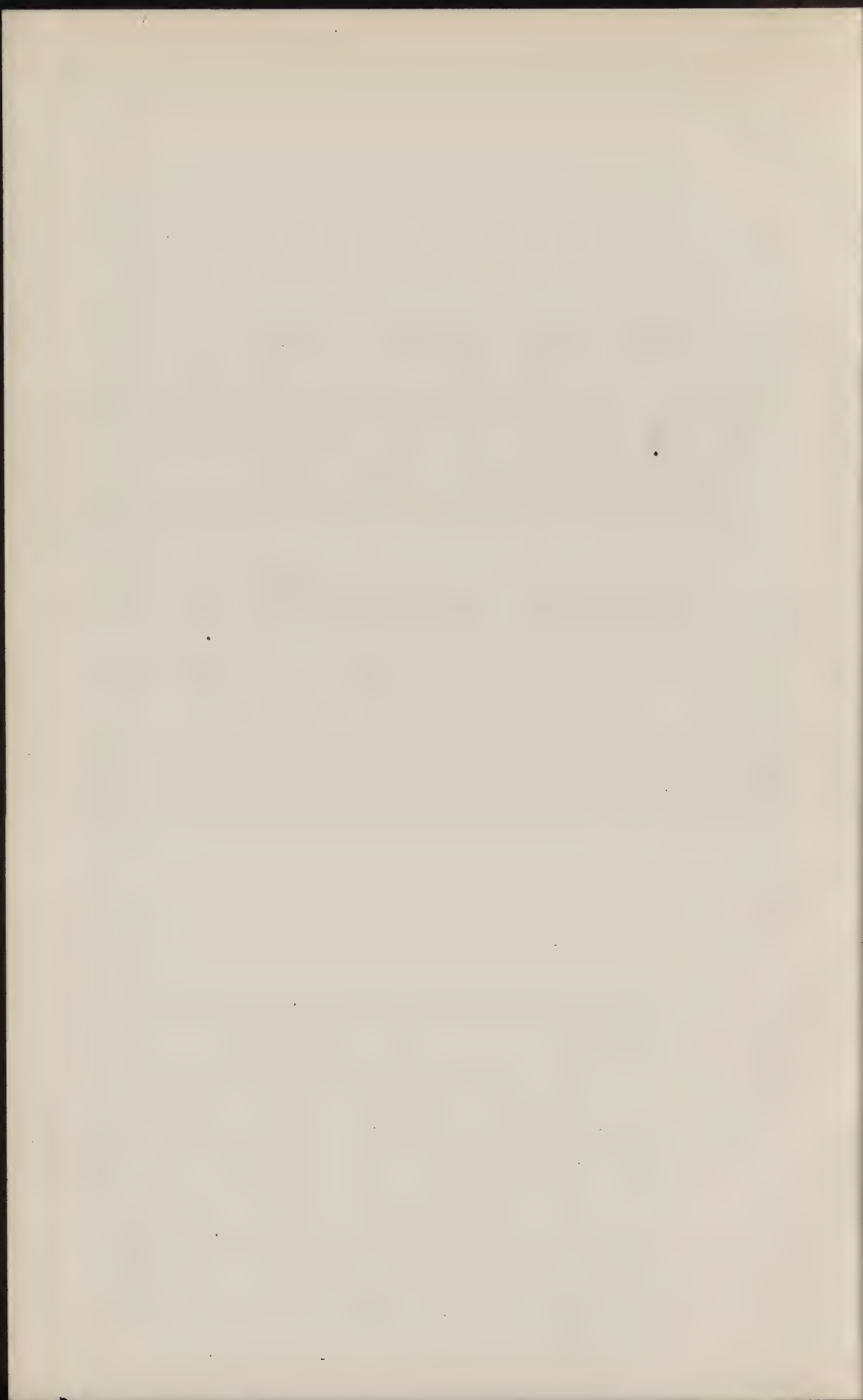
Peace has now come. But instead of facilitating the problem of child conservation, peace may even intensify the difficulties. Those who are in close touch with labor problems give as their opinion that production must continue at almost war rate for the next two or three years; that as the world has been stripped of its resources, the total amount of industrial activity will show no falling off. There will be shifting and dovetailing, but the cancellation of war contracts will not mean wholesale unemployment. The nature of the work will be altered, but not the demand for labor in private enterprise. Many firms holding war contracts have declared that the cancellation of these will not result in the discharge of any men.

Consequently if the children are to leave industry they must be taken out of industry by law; there has never been any other way. Unfortunately the disposition of the average employer to hire cheap labor does not depend upon the state of the adult labor market or the state of public opinion. Sooner or later the children who went to work for high wages in 1918 will find themselves in competition with the demobilized army of adult workers that will want to return to

industry. The competition can spell only disaster to both. The first requirement in the present situation is the forcible demobilization of the child workers. This can be done effectively only through the passage by Congress of a new federal child labor law that will stand the test of constitutionality.¹ Secondly, we must broaden and intensify national education. This means more money; we have got to pay our teachers an adequate wage. It seems inevitable that some form of activity in the schools themselves will be introduced to utilize and direct the normal instinct of all children to do things—an instinct which is instrumental under the present system in driving large numbers of boys and girls into premature employment. When this invaluable natural impulse is not caught in school and directed to the training of the child or by supervised activity outside school, the boy or girl can hardly escape exploitation as an unskilled worker when he enters industry. In general it may be stated that so far we give a balanced education in the public schools almost only to mental defectives, and in private schools to the children of the rich. Schoolmen themselves feel the need of more practical activity than is provided in the academic curriculum, but in many cases their sentiment has led them to endorse sending the child into industry for the necessary experience.

Lastly, let us seize the present moment when interest is thoroughly aroused in public health to double our efforts to give American children a start in life unhandicapped by preventable disease. Let us free our children from the incubus of conditions which can be prevented or cured. For a failure in this direction, should we further permit it, would tend quite as much as any direct effects of a war, to "spoil the breed."

¹ Such a law passed and went into effect April 24, 1919, as an amendment to the Revenue Act.



CHANGES IN FETUSES DUE TO FORMALIN PRESERVATION

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CARNEGIE INSTITUTION OF WASHINGTON, DEPARTMENT OF EMBRYOLOGY

Marked changes in size can frequently be noted in a fetus after it has been in formalin for some time. These may vary in different parts of the body, after different duration of preservation, in different specimens, and may consist in either shrinkage or an increase in size. Inasmuch as the age of a human fetus is generally computed upon the sitting height, it is of importance to know how much this measurement may be altered by the action of the fluid in which the specimen is preserved. In an anthropological study of the fetal body such knowledge is of great assistance, and until the problem of possible changes in the proportions of the body has been solved, any comparison between the fresh and preserved material is unsafe.

In this paper it is intended to determine in a preliminary way the average changes produced by formalin in a few of the more important measurements, and to detect, if possible, certain factors which influence the relative amount of change. Measurements were made of the sitting height, head length and head breadth of 18 human fetuses (ranging in age from the third to the ninth month) in the Carnegie Collection of embryos, and of the sitting height of 48 fetal pigs in various stages of development; the procedure being done first upon the fresh specimens and repeated at intervals after preservation in 10 per cent formalin (*i. e.*, ten parts of 40 per cent formalin and 90 parts of distilled water).

In Table I is given the sitting height of the human fetuses, the last column showing the percentage of loss or gain after 36 weeks of preservation. On an average the sitting height decreases with the duration of preservation, although this may not be the rule in individual instances. The decrease is most marked in the first week. The final relative changes amount on an average to a loss of 2.54 per cent and are somewhat variable, ranging from + 1.8 to - 6.7 per cent.

TABLE I
SITTING HEIGHT OF HUMAN FETUSES

TABLE II
HEAD LENGTHS OF HUMAN FETUSES

TABLE III
HEAD BREADTHS OF HUMAN FETUSE

No.	Weeks in Formalin:				Final Change in Per-centage	No.	Fresh	Weeks in Formalin:				Final Change in Per-centage	Weeks in Formalin:				No.	Fresh	Weeks in Formalin:				Final Change in Per-centage		
	Fresh	1						8	36	1	3		8	36	1	3			8	36	1	3		8	36
2066	cm.	5.4	5.2	5.2	cm.	5.15	2066	mm.	22	21	21	mm.	20.5	2066	mm.	16.5	17	17	mm.	36	0				
1993	9.95	9.8	9.85	9.85	9.7	- 2.5	1993	34	35	35	34	35	+ 2.9	1993	30	31	31	30.5	37	+ 1.7					
1973	12.0	11.6	11.5	11.3	11.2	- 6.7	1973	45	45	45	46	46	+ 2.2	1973	37	36	37	38	37	0					
2004	13.4	13.75	13.7	13.4	13.2	- 1.5	2004	47	50	49.5	49.5	49	+ 4.3	2004	37	44	43	43	42	+ 13.5					
2082	16.7	15.7	15.5	15.7	15.6	- 6.6	2082	59	58	58	58	58	- 1.7	2082	51	50	51	51	52	+ 2.0					
2100	17.0	17.1	17.2	17.1	16.9	- 0.6	2100	59	60	61	61	60	+ 1.7	2100	51	50	51.5	52	52	+ 2.0					
1928	17.3	16.4	16.5	16.5	16.2	- 6.4	1928	55	54	54	54	54	- 1.8	1928	45	44	44	44	43	- 4.4					
1964	17.3	17.2	17.3	17.2	17.2	- 0.6	1964	66	65	67	66.5	67	+ 1.5	1964	50	50	51	52	52	+ 4.0					
1939	17.8	17.8	17.8	17.8	17.7	- 0.6	1939	62	62	64	64	62	+ 4.8	1939	51	51	53	54	54	+ 5.9					
1924	18.0	18.0	18.2	18.0	17.8	- 1.1	1924	63	65	68	68	66	+ 4.8	1924	51	54	60	59	56	+ 9.8					
2085	18.9	18.0	18.2	18.2	18.1	- 4.2	2085	69	67	68	70	69	0	2085	55	55	57	58.5	59	+ 7.3					
2063	18.9	19.1	19.1	19.1	19.1	+ 1.1	2063	75	74	74	74	74	- 1.3	2063	52	55	56	62	62	+ 1.6					
2070	20.8	20.1	20.4	20.4	20.2	- 2.9	2070	77	77	76	77	77	77	2070	61	59	58	62	62	+ 8.5					
2049	21.9	21.0	20.9	20.8	20.7	- 5.5	2049	76	78	78	78	78	+ 2.6	2049	59	61	61	63	64	+ 10.9					
2041	22.5	22.5	22.6	22.8	22.5	0	2041	86	86	86	87	87	+ 1.2	2041	64	66	69	71	71	+ 2.8					
2089	22.6	23.7	23.5	23.3	23.0	+ 1.8	2089	91	92	92	92	92	+ 1.1	2089	71	71	72	73	73	+ 6.8					
1934	23.8	23.4	23.3	23.1	23.0	- 3.4	1934	78	80	81	80	82	+ 5.1	1934	59	60	60	60	63	+ 6.9					
1922	28.6	29.3	28.8	28.7	28.2	- 1.4	1922	106	107	105	108	106	0	1922	87	91	91	92	93	+ 4.83					
Ave.	17.94	17.76	17.75	17.69	17.53	- 2.54	Ave.	65.0	65.4	65.7	66.0	65.7	+ 0.88	Ave.	51.5	52.6	53.5	54.1	54.2	+ 4.83					

The absolute size of the specimen seems to have no noticeable influence upon the relative change in the sitting height. It was thought that the condition of the specimen may be largely responsible for the amount of change; this, however, was not confirmed by the findings, as the changes were as marked in specimens in excellent condition as in those which showed slight maceration.

Table II is a compilation of the head lengths of the same series taken in the fresh state and after preservation. On an average there is a slight increase in this measurement during preservation, and this reaches its maximum after the eighth week. In many individual cases, however, the changes were rather irregular. The increase in the head length after 36 weeks of preservation amounts on an average to 0.88 per cent. Again, this relative change is found to show a considerable variability, its extremes being -6.8 and $+5.1$ per cent. The absolute size and the condition of the specimen have no apparent influence upon the relative amount of change in the head length.

In Table III is given the head breadth of each human fetus in the fresh state and at the different stages of preservation. As in the preceding tables, the last column represents the percentage of final change. On an average the head breadth increases during preservation, and this is most marked in the first three weeks. The average increase after 36 weeks in formalin amounts to 4.83 per cent, which is five and a half times as great as the average relative increase of the head length. In only one case was there a decrease after preservation, and this amounted to 4.4 per cent. The greatest increase was 13.5 per cent. Like in the preceding measurements, the relative changes are rather variable, and appear to be independent of the absolute size or the condition of the specimen.

The much greater average change in the breadth of the head as compared to its length involves as a necessary consequence a change in the cephalic index from that noted in the fresh specimen. The changes in this index after 36 weeks of preservation resulted in an average gain of 3.93 per cent, the extremes of these relative changes lying at -2.7 and $+9.7$ per cent. In only 17 per cent of the fetuses was there a slight decrease in the cephalic index due to the preservative; in all the remaining specimens there was a more or less marked increase. As would be expected from the above, the cephalic index changes as much in the larger fetuses as in the smaller ones. It may be stated in this connection that the combination of a decrease in the sitting height and an increase in the length and breadth of the head

results in the head showing a relative to the body greater size after preservation.

The pig fetuses were all obtained in an absolutely fresh state, and were still warm when measured. Only a portion of each litter was put in formalin immediately, the others being kept either in distilled water for 3 days or in air for 15 hours before fixation. This was done in order to determine to what extent, if any, the changes may be influenced by the fact that the fetus was dead some time before abortion, or had not been fixed immediately following abortion. It may be mentioned that the human, as well as the pig fetuses, were kept in large jars with plenty of formalin, so that a loss in strength of the solution through absorption of water from the specimens was negligible.

In the fresh fetuses the sitting height (from the most cranial point on the forehead to the most caudal point beneath the tail) ranged from 64 to 269 mm., as in the human series, a wide variety of sizes being represented. The fetuses that were kept in water changed their sitting height very little during this time, and showed either a slight shrinkage or an increase in length of not more than 1 per cent. The loss in sitting height after 36 weeks in formalin was practically as great in these specimens as in those from corresponding litters that were fixed when fresh, and on an average closely approaches the average relative loss of the whole series. The sitting height of the fetuses that had been kept in air for 15 hours before fixation diminished in that time from 2 to 5 per cent. These specimens lose less in their sitting height during preservation than those fixed when fresh, but when this decrease is added to that resulting from exposure to the air the final loss when compared with the sitting height of the fresh specimens is quite as great. These facts tend to prove the conclusion previously drawn from a study of the human fetuses; *i. e.*, that a fetus in good condition will undergo as much change in formalin as will one in poor condition, no matter whether the latter may be due to death *in utero* or to delay in fixation.

The average relative loss in sitting height of the pig fetuses after 36 hours in formalin is 5.67 per cent. This is more than twice as high as in the human specimens. These relative changes are also rather variable, the extremes being 0 and - 10.5 per cent; *i. e.*, the sitting height of a fresh fetus may either not alter at all or may decrease as much as one tenth during preservation. Not one of the pig fetuses showed an increase in the sitting height after being in formalin. As was found in the human fetuses, that the absolute size does not notice-

ably influence the relative change in the sitting height, no correlation between the sitting height and its relative change during preservation could be detected, the larger fetuses changing relatively quite as much as the smaller ones. It is not impossible that embryos and very small fetuses, which are not included in this study, may show a somewhat different behavior in formalin. The averages of the sitting height of the pig fetuses were, 132.6 mm. in fresh condition, 126.8 mm. after 1 day in formalin, 126.6 mm. after 1 week, 125.2 mm. after 8 weeks, and 124.7 mm. after 36 weeks. From these figures it can be seen that the greatest and most rapid reduction in length occurs during the first day of preservation.

The weight of the pig fetuses, in the fresh state and at intervals during preservation, was also taken, and here the influence exerted by the condition of the specimen upon the relative change in formalin was clearly manifested. The fetuses that were placed in formalin immediately after they were measured and weighed, still warm, increased in weight during the 36 weeks of preservation on an average of 6.51 per cent. The variability of the relative changes, however, is considerable, ranging from - 12.7 to + 17.7 per cent, without showing any correlation with the absolute weight of the specimen. A decrease in weight in a specimen preserved in a fresh state is exceptional, occurring in only two instances. The average weight of all these specimens was before preservation 139.3 grams, after the first day in formalin 144 grams, after 1 week 157.3 grams, after 8 weeks 156.9 grams, and after 36 weeks 151.7 grams. These figures show that the increase in weight reaches its maximum at the end of the first week, after which the weight decreases slowly. Hrdlička in a careful study of the influence of preservatives upon the brain (Brains and brain preservatives, *Proc. U. S. Nat. Mus.*, 1906, xxx, 245), found the same sharp initial rise and subsequent gradual decline of weight due to the formalin. According to him the brain also shows marked individual variation of change in weight during preservation, as was noted in the fetuses.

The pig fetuses that were kept in distilled water for 3 days prior to fixation showed considerable variability in their weight changes during this time, as well as in formalin. The weight of some increased during the 3 days in water, while that of others, even from the same litter, decreased. In all of this series the weight was less after the first day in formalin than it was after 3 days in water. After one week in formalin the weight, without exception, increased again. In the

subsequent weeks, however, it either increased or decreased, the extremes being respectively $+ 4.2$ and $- 10.3$ per cent of the weight of the fresh specimen. On an average the relative change consisted in a loss of 0.36 per cent.

The fetuses kept in air for 15 hours before being fixed lost during this period from 2 to 8 per cent of their weight, but became heavier again after 1 day in formalin. The final changes after 15 hours in air and 36 weeks in formalin amount on an average to a loss of 1.9 per cent. These relative changes are rather variable in the individual cases, and may consist in even a gain in weight. The loss during preservation in the fetuses kept in water or in air before fixation contrasts with the gain of 6.5 per cent in those preserved while in a perfectly fresh state.

In summarizing briefly the study of the changes in the fetal body produced by a solution of 10 per cent formalin, the following results may be enumerated:

The sitting height decreases during 9 months of preservation on an average of 2.5 per cent in human, and 5.7 per cent in pig fetuses.

The head length of the human fetus increases during preservation on an average of 0.9 per cent.

The head breadth of the human fetus increases on an average of 4.8 per cent.

The greatest and most rapid change in these measurements occurs at the beginning of preservation.

The cephalic index increases in human fetuses during 9 months of preservation on an average of 3.9 per cent.

The absolute and relative size of the head of a human fetus increases during preservation.

The absolute size and the condition of the fetus have no apparent influence upon the relative amount of change in the above measurements.

The weight of fetuses increases if they are preserved immediately after death, but decreases if the specimen is in poor condition when placed in formalin. The weight of the former will increase most within the first week of preservation, and will drop again slowly later on.

The individual variation of change in all the measurements taken, and also in the weight, is quite marked.

The demonstration of the possibility of changes in proportions and relative sizes of different parts of the fetal body under the influence

of preservatives invites further study in this direction, in order to enable us to reduce the anthropometric findings on preserved fetuses to conditions in the fresh material. The disadvantage incident upon these changes is not attributable alone to 10 per cent formalin; very probably it is even more pronounced in solutions of greater strength, as well as in alcohol; it appears, in fact, to be associated with all known preservative fluids.

ANTHROPOMETRY

ALEŠ HRDLIČKA

Definition: *Anthropometry* may perhaps be most simply and comprehensively defined as the conventional art or system of measuring the human body. The systems of measuring the skull and the skeleton are known separately as *craniometry* and *osteometry*, but these terms are frequently merged with that of anthropometry; thus we speak only of anthropometric instruments, anthropometric methods, anthropometric laboratories.

Object: The object of anthropometry is to supplement visual observation, which is always more or less limited and uncertain, by accurate mechanical determinations. The ideal function of anthropometry would be the complete elimination of personal bias, and the furnishing of absolutely correct data on such dimensions of the body, organs, or skeleton, as might be of importance to those who use the measurements. This ideal is not attainable to a perfection, but it is the highest duty for every worker to strive for as close approach to it as may be in his power.

Diversity: Anthropometry in general is not and may never be one uniform system. It is a handmaid to various classes of workers who have different objects in view, and measurements that are indispensable to one may be of no concern to another observer.

Measurements of the body were begun and are used by the artisan, and by the artist, the object of the one being a proper "fit" and that of the other a correct or artistically superior production. They were and are employed in recruiting armies, with the aim of eliminating the inferiors. They are used to some extent by medical men and dentists, to assist them in reaching diagnosis or tracing improvement in their patients. They enter largely into the modern systems of college and other gymnastics, and lately also into those of the popular baby studies. Certain measurements play important rôle in criminological and medico-legal identification. Finally, we have measurements that have become invaluable aids to scientific research in physiology, anatomy and especially anthropology.

To summarize, measurements on the human body or its parts are practiced for:

1. Industrial purposes;
2. Regulation of art;
3. Military selection;
4. Medical, surgical, and dental purposes;
5. Detection of bodily defects and their correction in gymnastics;
6. Criminal and other identification;
7. Eugenic purposes; and for
8. Scientific investigation.

As a result of the multiple applications of body measurements, there have become differentiated, aside from the industrial and artistic systems which are of little interest to us in this connection, the military, criminological, and also clinical and eugenic anthropometry, besides that used for strictly scientific research and more particularly for anthropological purposes. As to the last named, were it not for the seeming alliteration of the two words, the term *Anthropological anthropometry* would be of real utility.

The diversity of measurements in the various above named branches of activities is a legitimate necessity. Regrettably, this diversity extends also more or less to instruments and methods, which makes a free interutilization of the obtained data difficult if not impossible. There is a great loss of effort, and even the most closely related of the above branches remain more or less strangers to each other. One of the foremost aims of all those interested in anthropometry in the broader sense should be a general unification of instruments and methods, as far as this may be practicable.

Anthropology: The present treatise is devoted to measurements used in anthropology. The aim of anthropological measurements is, not to replace, but supplement visual and other observations, or give them more precision.

Variety of Measurements: There are none except natural limits to the number or variety of measurements that can be legitimately practiced on the human body or its remains. Moreover, every measurement or set of such, if carefully secured on sufficient numbers of individuals representing different human groups, will be of some value. But some of the measurements were early seen to be of greater general interest or importance than others, came into universal use, were properly regulated, and constitute to-day the anthropological system of anthropometry. This system, however, though rigid in

essentials, has no definite limits, and is subject to such changes as may in the course of time be found advisable.

In the development of the system it was soon found that diversity of method was very prejudicial to progress, which led to attempts at regulation of the methods and instruments by schools, by national, and finally by international agreements. Unfortunately, the earlier agreements conflicted, in consequence of which a great deal of work was lost. Up to the Franco-Prussian war of 1870, the system of Broca or the French school was almost universal; after the war, however, the rapidly growing tendency in Germany for individualism did not spare anthropometry. In 1874 the first proposals in this direction were made by Prof. Ihering to the Congress of the German anthropological societies. In 1877 a Craniometric Conference was held on this subject at Munich, and still another took place in 1880 in Berlin. The outcome of the deliberations of these conferences was a scheme drawn up by Professors Kollman, Ranke, and Virchow, which was submitted for consideration to the 13th General Congress of the German Anthropological Society, held at Frankfort-on-Main in 1882. The scheme was adopted and designated the "Frankfort Agreement."¹ It introduced new nomenclature and other modifications, with unfortunate results. Henceforth there were the "French School" and the "German School" of anthropometry. But the new system did not prevail and the need of an international unification of methods began to be felt.

One of the first attempts at an international unification of anthropometric measurements was made in the early 90's in Paris, by Dr. R. Collignon.² The effort was made in connection with certain anthropometric studies planned by him at that time, and consisted in his sending to various anthropologists of prominence in as well as outside of France certain propositions, with a request for their critique and opinion. The effort, while favored in France, remained that of an individual, and led to nothing definite.

A much more promising, yet in the end quite as fruitless effort for unification of anthropometric methods was made at the occasion of the Twelfth International Congress of Prehistoric Anthropology and Archeology, held in August of 1892, at Moscow. Two commissions

¹ Garson, J. G. The Frankfort Craniometric Agreement, with Critical Remarks thereon. *J. Anthropol. Inst. Gr. Brit. & Ire.*, 1885, xiv, 64-83.

² Collignon, R. Projet d'entente internationale au sujet des recherches anthropométriques dans les conseils de revision. *Bull. Soc. Anthropol. Paris*, 1892, xiii, 186-8.

were appointed for the purpose (see p. 48) but they accomplished nothing substantial. The interest in the subject was however well aroused by this time, and the anthropologists meeting in 1906 with the XIIIth International Congress of Prehistoric Anthropology and Archeology in Monaco, undertook seriously and in a large measure successfully the formation of an International Agreement on Anthropometry. The work thus auspiciously begun was continued by the anthropologists meeting with the XIVth Congress, in 1912, at Geneva. The task thus undertaken is not yet finished; but what has been done furnishes a sound and large nucleus for further developments. At the occasion of the XVIIIth International Congress of Americanists, at London, in 1912, foundations were laid for the formation of an international association of anthropologists,¹ and one of the main features of such an association will be, it is strongly hoped, a permanent International Anthropometric Board, which will deal with all questions relating to the harmonization of anthropometric methods, instruments, and procedures.

The results in anthropometric unification thus far attained are embodied in two reports, published originally in French in 1906, and in the French, English and German in 1912. As these agreements are of fundamental importance to every worker in physical anthropology, and as they are not as readily available as desirable, they will be here republished. In translating the French report of 1906 there were found a number of points which needed a few words of explanation and this report, therefore, is annotated.

THE INTERNATIONAL AGREEMENT FOR THE UNIFICATION OF CRANIOMETRIC AND CEPHALOMETRIC MEASUREMENTS

REPORT OF THE COMMISSION APPOINTED BY THE XIII INTERNATIONAL CONGRESS OF PREHISTORIC ANTHROPOLOGY AND ARCHEOLOGY, AT MONACO, 1906

BY DR. G. PAPILLAUT, REPORTER OF THE COMMISSION

Translated from Dr. Papillaut's report in *L'Anthropologie*, 1906, XVII, 559-572, by A. H.

On the motion of MM. Hamy, Papillaut and Verneau, the Organizing Committee of the XIIIth International Congress of Prehistoric

¹ See Marett, R. R. Report of an International Conference, etc. Proc. XVIIIth Intern. Cong. Amer., London, 1913, I, LXXXVI.

Anthropology and Archeology had included among the questions a consideration of which by the members of the Congress was regarded as of the greatest importance, the subject of unification of anthropological measurements.

At the opening session of the Congress, which took place at Monaco on the 16th day of April, 1906, Professor Hamy, as President, called attention to the urgent need of an international agreement on anthropometric technique. But he also called attention to the almost insurmountable difficulties which would be met with if the numerous measurements which had been employed to date were to be examined in the open session of the Congress, and to the consequent necessity, if satisfactory results were to be obtained, of appointing a Commission which would specially occupy itself with the subject during the time of the session and at the last meeting of the Congress present some project of unification for approval by the Congress.

This proposition was adopted, and the commission was named immediately, comprising the following:

Giuffrida-Ruggeri, Secretary of the Anthropological Society and Assistant to the Chair of Anthropology, Rome;

Hamy, Professor of Anthropology at the Museum of Natural History, and member of the Institute, Paris;

Hervé, Professor of Ethnology at the École d'Anthropologie, and former President of the Anthropological Society, Paris;

Lissauer, President of the Anthropological Society, Berlin;

Von Luschan, Professor of Anthropology, University of Berlin;

Papillault, Assistant Director in the Laboratory of Anthropology of the École des Hautes Etudes, and Professor at the École d'Anthropologie, Paris;

Pittard, Private Docent at the University of Geneva;

Pozzi, one of the Professors of the Faculty of Medicine and former president of the Anthropological Society, Paris;

Sergi, Professor of Anthropology and Director of the Anthropological Institute, Rome;

Verneau, Assistant to the Chair of Anthropology, at the Museum of Natural History and Temporary Professor at the École d'Anthropologie, Paris; and

Waldeyer, Professor of Anatomy, and permanent Secretary of the Academy of Sciences, Berlin.

The Commission met immediately after its nomination to elect its officers and arrange the program of its activities. Professor Waldeyer

was chosen President, Professor Sergi Vice-President, and Dr. Papillault Secretary and Reporter.

Dr. Papillault read a letter which he had received from M. Chantre, in reply to the demand which he [Dr. Papillault] had made for his [M. Chantre's] report on the efforts for the unification of anthropological measurements undertaken by the International Congress of Anthropology of Moscow. The main part read as follows:

"I have been, in fact, charged with such a report at the Congress of Moscow for the Congress of Paris. But as the question [of unification of anthropological measurements] had not been made a part of the regular program at the Moscow meeting, Professor Virchow, Chairman of the International Commission of Craniometry, in accord with some of our colleagues, asked that the said report should not be presented until at the following [Paris] session."

In M. Chantre's report on anthropology at the Moscow congress, we read that two Commissions were named for the purpose of unifying anthropological measurements. They were:

1. *The Anthropometric Commission*, appointed following a communication by M. Zograff on "Anthropometric methods as practiced in Russia, and on the necessity of forming an international agreement for anthropometric research." This commission was to "endeavor to unify as far as possible the methods of anthropometric observations," and to report at the next session. It was composed of MM. Anoutchine, Bogdanoff, Chantre, Kollman, Malieff, Sergi, Tikhomiroff, Virchow, and Zograff. M. Bogdanoff was elected its President and M. Zograff a Secretary and Reporter. The headquarters of the commission were with the Imperial Society of Natural Sciences and Anthropology of Moscow.

2. *The Craniometric Commission*. On the motion of Professor Kollman of Basle the Congress named also a commission to revise the Convention of Frankfort, with the object of securing for anthropology an international system of craniometric measurements. This commission consisted of MM. Anoutchine, Bogdanoff, Chantre, Kollman, Malieff, Sergi, Virchow, and Zograff. Professor Virchow was elected its President, Professor Anoutchine its Secretary-Reporter.

The letter from M. Chantre shows further that neither of these commissions has reached any appreciable results. The Anthropometric Commission, it seems, has never met; while the Craniometric Commission held only two meetings during the session of Moscow, without reaching any agreement.

M. Papillault insists on the necessity of the present Commission meeting at least twice a day during the entire session, in order to subject the various techniques actually employed in anthropometry to a serious revision and to reach an agreement. The matter is urgent. The Frankfort agreement has been abandoned by most of the German scientists themselves, and the French method is no longer uniform. At Paris the disciples of Broca retain perhaps the illusion of still following a uniform technique, but a little inquiry shows divergencies which render all comparison of the results of some of their measurements quite incorrect. The school of every country presents probably divergencies of method among its different members which equal and even exceed those that separate it from other schools. This simple statement should banish from our debates all motives that may be foreign to science. None of us would endeavor to defend a national tradition which has proved incapable of preserving a unity of doctrine, and such a tradition in fact exists no more. In its selection of a technique the commission should be guided solely by fitness, simplicity, precision, and the biological value of the various measurements.

On the motion of Professor Waldeyer the commission decided to limit its activities to the measurements of the head [and skull] which are so numerous as to claim all the time that might be at the disposal of the Commission. Every measurement which has gained even a limited usage, together with the principal variations in its technique, should be submitted by the Secretary for revision by the Commission. In every case where an agreement will be reached, the Secretary shall edit the definition and technique of the measurement in question between the sessions of the Commission, and submit the text for the approval of the latter.

The Commission terminated its work Saturday, April 21, and the Secretary announced to the Congress that the report was ready in a neighboring room where it could be freely consulted. At the same time he offered to give the members of the Congress whatever explanations might be found necessary. At the end of this day's session, the report in its final form was presented to the Congress by the President, and received a *unanimous approval*. It here follows:

PROJECT OF AN INTERNATIONAL AGREEMENT ON CRANIOMETRIC AND CEPHALOMETRIC MEASUREMENTS

Preliminary remarks: The Commission classed as *optional* certain measurements which appear interesting, but concerning which the

Commission does not possess sufficient details which would permit it to fully gauge their importance and advise their regular employment. In cases of this nature the Commission has contented itself with a statement concerning the technique of the respective measurements without giving its advice as to their use.

In connection with each measurement is given an indication as to the instrument which should be employed. The abbreviations are as follows:

c.g.—compas glissière, the sliding compass;

c.e.—compas d'épaisseur, the spreading compass;

m.t.—metric tape. This should be made of decidedly pliant material, but without possessing in the least degree the quality of stretching. Slightly starched cloth is of the best; and frequent testing of the tape by a metal standard is indispensable.

I. CRANIOMETRY

A. THE SKULL

1. *Maximum length of the skull or greatest antero-posterior diameter; c.e.*
This is the maximum glabello-occipital diameter of the vault.¹

Landmarks: Anteriorly—the most prominent point of the glabella; posteriorly—the most prominent point on the occiput as shown by the maximum determinable spread of the branches of the compass.

2. *The Iniac antero-posterior diameter (optional); c.e.*

Taken in the sagittal and median plane of the vault.

Landmarks: Anteriorly—the most prominent point of the glabella; posteriorly—the inion, the individual peculiarities of which should be discounted.²

3. *The maximum breadth of the vault, or the greatest transverse diameter; c.e.*

This is the greatest horizontal and transverse diameter which can be found on the vault by the spreading compass.

Landmarks: Determined solely by the maximum breadth of the skull above the supra-mastoid and zygomatic crests.

¹ The French text reads: "C'est le plus grand diamètre dans le plan sagittal et médian du crâne." This definition is somewhat erroneous, for it seems to direct that the measurement be taken to a point in the median line of the skull, while a little further on this point is defined as "le point le plus saillant du sus-occipital donné par le maximum d'écartement des branches du compas." As a matter of fact the point of maximum distance from the glabella is seldom strictly in the median line of the occipital, even in absolutely normal specimens. The correct definition should read as given above. A. H.

² "dont les variétés individuelles devront être évitées."

4. *Heights of the vault:*(a) *The basilo-bregmatic height; c.e.*

Landmarks: Inferiorly—the basion, or median point of the anterior border of the foramen magnum (avoiding the exostoses which are some-

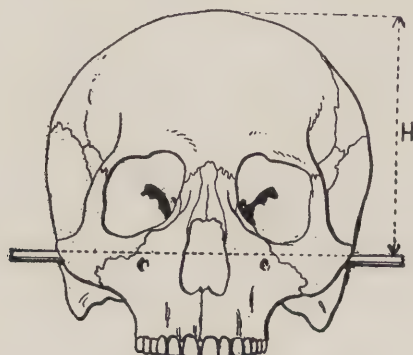


FIG. 1

times found at this place); superiorly—the bregma, or median point of the coronal suture.

(b) *Auriculo-bregmatic height (H, fig. 1).*

This is the distance between the bregma and a line connecting the superior border of the auditory meatus.

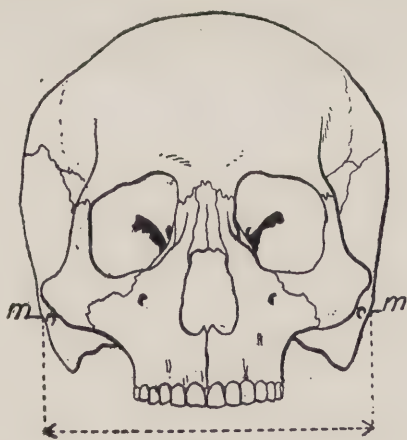


FIG. 2

Landmarks: Inferiorly—the point where the imaginary line uniting the superior borders of the two *meatus auditorius* intersects the median part of the skull; superiorly—the bregma.

5. *The smallest frontal breadth or minimum frontal diameter, c.g.*

This is the shortest horizontal diameter between the two temporal crests on the frontal bone.

6. *The maximum frontal breadth or maximum frontal diameter; c.g.*

This is the largest horizontal diameter of the frontal squama (the bistephanic diameter of Broca is abandoned).

7. *Maximum bimastoideal diameter (m.m. fig. 2); c.e.*

Landmarks: The external surface of each mastoid process at the level of the center of the meatus auditorius. At this level search with the spreading compass for the maximum diameter.

8. *The maximum bizygomatic diameter; c.g.*

Landmarks: The most widely separated points on the external surface of the zygomatic arches. The object is to find the greatest diameter.

9. *The naso-basilar diameter; c.e.*

Landmarks: Anteriorly—the nasion, or median point of the naso-frontal suture; posteriorly—the basion.

10. *The basio-alveolar diameter; c.g.*

Landmarks: Anteriorly—the alveolar point, or median point of the anterior border of the alveolar arch; posteriorly—the basion.

11. *The nasion-menton diameter; c.g.*

Landmarks: Above—the nasion; below—the inferior border of the lower jaw, in the median plane.

The mandibula to be in place, the jaws brought in apposition, the condition of the teeth [in relation to wear, especially] to be noted.

12. *The naso-alveolar diameter;³ c.g.*

Landmarks: Superiorly—the nasion; inferiorly—the lowest point of the alveolar border between the two median upper incisors.

13. *Nasal height; c.g. (N E fig. 3).*

Landmarks: Superiorly—the nasion; inferiorly the middle of a line connecting the lowest points of the two nasal fossae.

If instead of the border there is a gutter, measure to the level of the floor of the nasal fossae [*i. e.*, the upper limiting line of the gutters].

³ The facial index is expressed by the following formula:

$$\frac{\text{Naso-alveolar diameter} \times 100}{\text{maximum bizygomatic diameter}}$$

14. *Breadth of the nasal cavity; c.g.*

Landmarks: The lateral borders of the nasal aperture. Find with the compass the greatest diameter of the aperture in horizontal line.

15. *Inter-orbital breadth; c.g.*

Landmarks: Bilaterally—the point where the posterior lacrymal crest meets the inferior border of the frontal.

16. *Orbital breadth.*

Landmarks: Medially—the dacryon, or point of meeting of the sutures formed by the frontal, the lacrymal, and the ascending part of the superior maxillary bones;

(If the dacryon is obliterated, or in an abnormal situation, take the point where the posterior lacrymal crest meets the inferior border of the frontal);

Distally—the external border of the orbit, at the point where the transverse axis of the orbit meets the border, and parallel as far as possible to the superior and inferior borders.

17. *Orbital height; c.g.*

Landmarks: The superior and inferior borders of the orbit, avoiding the superior and inferior notches, when they exist. Take the maximum distance between the two borders along an axis perpendicular to the preceding measurement [orbital breadth].

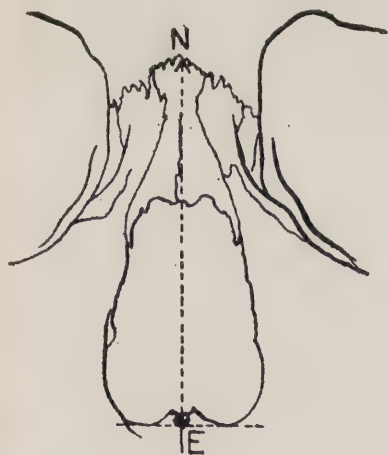


FIG. 3

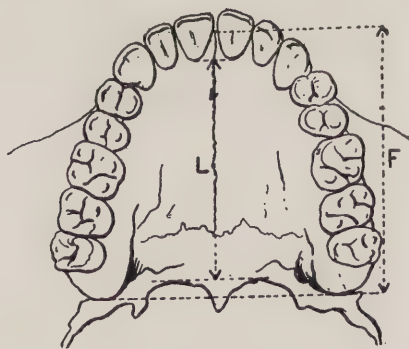


FIG. 4

18. (a) *Breadth of the upper alveolar border; c.g.*

Landmarks: The external surface of the alveolar border, on each side.

If there are any exostoses on the border they are to be avoided by placing the points of the instrument above the same. The measurement to be taken is the maximum transverse separation of the alveolar borders.

(b) *Length of the alveolar arch; c.g. (F, fig. 4).*

Landmarks: Anteriorly—the anterior surface of the alveolar border between the two median incisors; posteriorly—the middle of a transverse line connecting the posterior extremities of the alveolar border.

[This transverse line is obtained easily by placing a wire as deep as possible on each side in the notch which separates the alveolar border from the pterygoid process.]⁴

19. *The bony palate; c.g. (optional).*

(a) *Length of the palate (L, fig. 4).*

Landmarks: Anteriorly—the median point of a line tangent to the posterior alveolar border of the median incisors; posteriorly—the median point of a transverse line connecting the most anterior points of the notches in the posterior border of the palate.

(b) *Breadth of the palate.*

Distance between the [internal] alveolar borders between the second molars.

20. *Orbito-alveolar height; c.g. (optional).*

The minimum distance between the lower border of the orbit and the alveolar border.

21. *Foramen magnum; c.g.*

(a) *Length.*

Landmarks: Anteriorly—the basion; posteriorly—the opisthion, or median point of the posterior border.

(b) *Breadth.*

Landmarks: Points of maximum separation, in transverse line, of the lateral borders of the foramen.

22. *Sagittal arc of the vault; m.t.*

Landmarks: Anteriorly—the nasion; posteriorly—the opisthion.

Intermediary: Apply tape to the surface of the vault along the sagittal line.

The arc is divisible into three principal parts which should be recorded separately and which correspond to the three bones composing the vault, namely the frontal, parietal and occipital.

⁴ The maxillo-alveolar index will be:

$$\frac{\text{Maximum breadth of the alveolar border} \times 100}{\text{Length of the alveolar arch}}$$

[This subdivision is not seldom vitiated by the presence of intercallated bones, especially at λ .]

23. *Transverse arc; m.t.*

Landmarks: Measure from the most prominent point on each zygomatic crest, directly above the meatus; the tape to be applied transversely over the vault in such a way that it will pass over the bregma and connect the two preceding points.

(b) *Circumference, or Horizontal Arc; m.t.*

Landmarks: Anteriorly—above the supraorbital ridges; posteriorly—over the upper portion of the occipital, so as to obtain the maximum measurement; care necessary that the level of the tape is the same on both sides.

24. *Capacity.*

Without making a selection from the different methods and while recognizing the value of the method of Broca, the commission advises that there should always be at hand standards or skulls of control, of considerably differing capacities, with which the exactness of the individual procedure should be verified; the commission also advises, however, the utilization as far as it may be possible of the direct measurement of cranial capacity by water with a rubber bag or container.

B. LOWER JAW

25. *Bicondylar breadth; c.g.*

Landmarks: The most external points on each condyle; the separation of these points constitutes the measurement.

26. *The bigonial breadth; c.g.*

Landmarks: The gonions, or points of the angles formed by the ascending branches with the body of the lower jaw.

The separation of the angles is measured by applying the compass to their external surface.

27. *Length [i. e., height] of the ascending branch; c.g.*

Landmarks: Superiorly—the uppermost point of the condyle;⁵ inferiorly—the gonion; but as frequently it is very difficult to determine this point, it is best to take the intersection of the lines prolonging the inferior and posterior borders of the bone.

⁵ The French original says "bord supérieur du condyle," which doubtless means the transverse ridge of the condyle on which the uppermost point is generally located. See illustration.

The measurement is obtained by permitting the lower jaw to rest on its inferior border, and placing the rod of the sliding compass along the posterior border.



FIG. 5

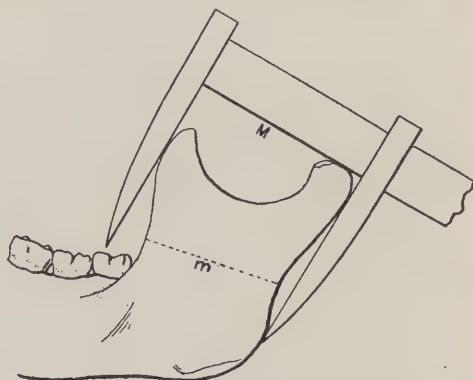


FIG. 6

28. *Breadth of the ascending ramus; c.g.*

(a) *Minimum breadth* (M, fig. 6): The minimum distance between the anterior and posterior borders of the ramus.

(b) *Maximum breadth* (M, fig. 6) (optional).

Landmarks: Anteriorly—the most prominent point on the anterior border of the coronoid process; posteriorly—the farthest point on the posterior border of the bone.⁶

The measurement is obtained by applying one of the branches of the sliding compass tangentially to the posterior border of the lower jaw, and bringing the other branch in contact with the anterior border of the coronoid process.

29. *Height of the symphysis; c.g.*

Landmarks: In the median plane: superiorly—the highest point of the alveolar border [bet. the median incisors]; inferiorly—the inferior border of the symphysis.

Measure the actual distance between the two points, not in projection.

30. *Height of the body of the lower jaw; c.g.*

The same technique, but the measurement is taken in a vertical plane, between the first and the second molars.

⁶ Really, as well seen from the illustration, the line connecting the most posterior point of the condyle and the point of the angle of the jaw. *Tr.*

31. *Maximum thickness of the body of the lower jaw* (optional).

The maximum separation of the internal and external surfaces of the bone in the plane between the first and second molars.

32. *Mandibular angle*.

The angle between the posterior and inferior borders of the bone. To be measured by Broca's *goniomètre* and according to the technique advised by that author.

II. CEPHALOMETRY

1. *Maximum length of the head, or the maximum antero-posterior diameter*; ⁷ *c.e.*

The same technique to be followed as on the skull; do not press.⁸

2. *The maximum breadth of the head or maximum lateral diameter*; *c.e.*
Same technique as on the skull.3. *Height of the head* (head erect). Instrument: The anthropometric square.

Landmarks: Superiorly—the vertex; inferiorly—the superior border of the auditory opening, which ordinarily corresponds (but the point should always be verified) to the parts of the notch between the tragus and helix.⁹

4. *The minimum frontal breadth*; *c.e.*

Same technique as on the skull.

5. *Maximum bimastoidal diameter*; *c.e.*

Same technique as on the skull, the observer standing behind the subject.

6. *Maximum bizygomatic diameter*; *c.e.*

Same technique as on the skull. The maximum should be searched for with care, for it is often located more posteriorly than one would expect.

7. *Bigoniac diameter*; *c.e.*

Same technique as on the skeleton. The fleshy parts of the masseters are to be avoided.

⁷ In all measurements on the living taken with the spreading compass it is indispensable to search for the greatest spread of the branches, then fix the latter in their position with the screw and replace them over adjoining parts to verify if the spread has really been maximum. [If proper care be taken the awkward fixation of the branches by the screw is not necessary. *Tr.*]

⁸ A moderate amount of pressure is of course advisable; the instruction is directed against hard pressure. *Tr.*

⁹ The height from the middle of the line connecting the floor of the external auditory canals, to bregma is now more in vogue. *Tr.*

8. *Height of the face, total; c.g. (optional).*¹⁰

Landmarks: In median plane, superiorly—the hair line; inferiorly—the inferior border of the lower jaw. A slight pressure is to be used, to discount the soft parts.

9. *Menton-nasion diameter; c.g.*¹

Same technique as on the skull, and using slight pressure, as with preceding measurement.

Look for the nasion by passing the nail along the ridge of the nose until it encounters a slight ridge which is formed by the inferior border of the frontal [or the depression of the nasion itself].

10. *The naso-buccal diameter; c.g.*

Landmarks in the median plane: Superiorly—the nasion; inferiorly—the line between the lips.

11. *The naso-alveolar diameter; c.g.*

Same technique as on the skull. It is always easily possible to turn the lips up so that the free border of the gums can be seen.

12. *Height of the nose; c.g.*

Landmarks: Superiorly—the nasion; inferiorly—the nasal septum where it joins the upper lip. Do not press.

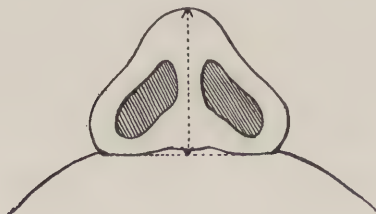


FIG. 7



FIG. 8

13. *Breadth of the nose; c.g.*

Landmarks: The external surface of the alae of the nose. The maximum breadth to be determined without the exertion of any pressure.

14. *Prominence of the nose at its base [i. e., length or height of the septum] (fig. 7).*

Landmarks: Anteriorly—the most prominent part of the point of the nose; posteriorly—the point where the septum is intersected by a transverse line joining the deepest points of the two naso-labial furrows.

¹⁰ Can be more readily taken with the spreading compass. *Tr.*

To take this distance the two landmarks should be well exposed [by bending the head well backward]; use instrument appropriate for the purpose.

15. *External bipalpebral breadth; c.g. (E, fig. 8).*

Landmarks: The external angle of each palpebral fissure, deeply, where the lines touch the eyeball.

With the eyes of the subject wide open and the visual axis fixed slightly above the horizon, the two points are approached by the branches of the compass supported on the cheeks of the subject.

16. *The internal palpebral breadth; c. g. (I, fig. 8).*

Landmarks: The internal angle of each eye, without regard to the caruncula.

17. *Breadth of the mouth; c.g.*

Landmarks: The commissures of the lips [angles of the mouth], at the point where the mucous membrane joins the skin. The distance

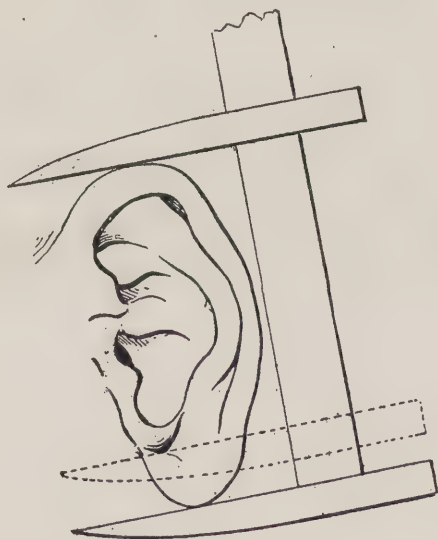


FIG. 9

to be taken while the mouth is in its medium position [*i. e.*, naturally closed without tension].

18. *Bilabial height; c.g.*

Landmarks: Superiorly—the uppermost points on the curves of the

arc of the upper lip; inferiorly—the lowermost point on the curve of the lower lip.

The rod of the compass should be held vertically, its branches tangent to the summits of the curves.

19. *The ear*.¹¹

(a) *Length, maximum; c.g.* (fig. 9, line designated).

Landmarks: Superiorly—the highest point on the border of the helix; inferiorly—the lowermost point on the lobule.

The rod of the compass should be held parallel to the long axis of the ear with its branches tangent to the points indicated; use no pressure.

(b) *Length of the cartilaginous ear* (fig. 8, interrupted line).

Landmarks: Above—as with preceding; below—the inferior border is the cartilaginous concha.

The compass is to be applied as in the preceding measurement, but the lobule is slightly pressed backward with the lower branch of the instrument, in order to include no more than the cartilaginous part.

(c) *Breadth.*

Distance between two lines parallel to the long axis of the ear, one of these lines being tangent to the anterior, the other to the posterior border of the helix.

The above outlined technique of each of the measurements was, after a discussion, unanimously adopted.

(Signed)

President, WALDEYER.

Vice President, G. SERGI.

Members of the Commission: GIUFFRIDA RUGGERI; E. T. HAMY; G. HERVÉ; LIS-
SAUER; VON LUSCHAN; PITTARD; POZZI; VERNEAU.

G. PAPILLAUT, Reporter.

¹¹ Measurement of the left ear is to be preferred as much more handy than that of the right. *Tr.*

THE INTERNATIONAL AGREEMENT FOR THE UNIFICATION OF ANTHROPOMETRIC MEASUREMENTS TO BE MADE ON THE LIVING SUBJECT

REPORT OF THE COMMISSION APPOINTED BY THE XIVTH INTERNATIONAL CONGRESS OF PREHISTORIC ANTHROPOLOGY AND ARCHAEOLOGY AT GENEVA (1912), TO SUPPLEMENT THE WORK COMMENCED BY THE XIIIth CONGRESS IN THE SESSION AT MONACO (1906)

ENGLISH TRANSLATION OF THE OFFICIAL VERSION¹

W. L. H. DUCKWORTH, M.D., Sc.D.

(One of the three recorders appointed by the Commission)

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THE INTERNATIONAL AGREEMENT FOR THE UNIFICATION OF ANTHROPOMETRIC MEASUREMENTS TO BE MADE ON THE LIVING SUBJECT

I. INTRODUCTION

During the International Congress of Prehistoric Anthropology and Archeology, held at Geneva from the 9th to the 12th September, 1912, an International Commission was appointed in order to determine the unification of anthropological measurements to be made on the living subject. The meetings had thus as their object, that of supplementing the work accomplished during the Congress held at Monaco in 1906, when the unification of craniometric and cephalometric measurements was achieved.²

The Commission which met at Geneva included the following members of the Congress:

¹ The Anthropological Laboratory of the University, New Museums, Cambridge. Oct. 30, 1912.

² International Congress of Prehistoric Anthropology and Archaeology, Session XIII, Monaco, 1906, Tome II, pp. 377-394.

Messrs. CHANTRE (France).
 CZEKANOWSKI (Russia).
 DUCKWORTH (Great Britain).
 FRASSETTO (Italy).
 GIUFFRIDA-RUGGERI (Italy).
 GODIN (France).
 HILLEBRAND (Hungary).
 HOYOS SAINZ (Spain).
 HRDLICKA (United States).
 LOTH (Russian Poland).
 VON LUSCHAN (Germany).
 MACCURDY (United States).
 MANOUVRIER (France).
 MARETT (Great Britain).
 MAYET (France).
 MOCHI (Italy).
 MUSGROVE (Great Britain).
 PITTARD (Switzerland).
 RIVET (France).
 SCHLAGINHAUFEN (Switzerland).
 G. SERGI (Italy).
 SOLLAS (Great Britain).
 VOLKOV (Russia).
 WEISGERBER (France).

The Commission sat on four occasions, as follows:

Sep. 11.	8 a. m. to mid-day.	President: Professor Manouvrier.
Sep. 13.	8 a. m. to 11 a. m. } 3 p. m. to 4 p. m. }	President: Professor G. Sergi.
Sep. 14.	9 a. m. to 10 a. m.	President: Dr. Duckworth.

Messrs. Duckworth, Rivet and Schlaginhaufen were appointed recorders of the proceedings, and were instructed to prepare the report of the Commission.

The full report of the recorders was adopted unanimously by the Commission at the meeting on Sep. 14, and also by the Congress at the concluding meeting on the same day.

II. GENERAL PRINCIPLES

(a) The *erect position* is adopted as that which the living subject shall assume for the purposes of measurement.

(b) The *method of projection* is adopted in all cases save those in which special mention is made of a different method.

(c) For "*paired*" measurements, the *left* side is recommended; but measurements of both the right and left sides are to be made in the two cases following:

$$\left. \begin{array}{l} \text{height of the acromion} \\ \text{height of the great trochanter} \end{array} \right\} \text{above the ground.}$$

(d) Observers are requested to indicate in every case, with precision, their method and the instruments employed.

(e) Those persons desirous of undertaking anthropometric work are very particularly urged to obtain preliminary *practical* instruction in a laboratory, and not to be content with a merely theoretical study of the various methods and processes of mensuration.

III. DETAILED DEFINITIONS OF THE MEASUREMENTS APPROVED BY THE COMMISSION AND THE CONGRESS

1. *Stature*: The subject stands erect on a horizontal and resisting plane surface (hereafter spoken of as "the ground"): no support is to be given by a vertical plane: the upper limbs are pendant, the palms of the hands turned inwards, and the fingers pointed vertically downwards, the heels in contact, and the axis of vision horizontal. The height of the vertex above the ground is to be measured in this position.

2. **Auditory canal*: anatomical landmark (*point de repère*) the bottom of the notch between the tragus and the helix. (This point had been adopted previously at the Monaco Congress: cf. *op. cit.* p. 391.)

3. **Chin*: anatomical landmark: the inferior border of the mandible in the median plane.

4. **Supra-sternal notch*: anatomical landmark: the deepest point in the hollow of the notch.

5. **Mammilla or Nipple*: anatomical landmark: the center of the nipple. This measurement is not applicable to women with pendant breasts.

6. **Umbilicus or Navel*: anatomical landmark: the center of the umbilical cicatrix.

7. **Pubes*: anatomical landmark: the upper border of the symphysis pubis in the middle line. Where this point is impalpable, guidance

* Measurements preceded by an asterisk, thus *, are those in which the subject retains the position already indicated for the measurement of the stature. [In making the measurements 2-8 and 10-18 inclusive the height of the "anatomical landmark" above the ground is to be determined. W. L. H. D.]

as to its position is given by the cutaneous fold of the lower part of the abdomen in this situation.

8. **Spinous process of the 5th lumbar vertebra*: to ascertain this anatomical landmark with exactitude, the subject shall be caused to bend forwards from the hips, when the spinous process of the 5th lumbar vertebra will become prominent.

9. *Sitting height*: the subject sits on a horizontal and resisting seat about 30 to 40 cm. high (this height being proportionate to the stature of the subject): the knees are flexed: the dorsal aspect of the trunk is to make contact with a vertical plane, or with the anthropometric rod at two points, viz. in the sacral region and again between the shoulder-blades. The axis of vision is horizontal, as in No. 1 (*supra*). The height of the vertex above the surface of the seat is to be measured.

10. *Pelvic height*: the subject retains the position adopted for the sitting height (No. 9). The height of the summit of the iliac crest above the surface of the seat is to be measured.

11. **Acromion*: anatomical landmark: superior and external border of the acromion process.

12. **Great Trochanter*: anatomical landmark: upper border of the great trochanter.

13. **Anterior superior iliac spine*: anatomical landmark: the summit of the anterior superior spine of the ilium. In cases of difficulty, the point is found by tracing Poupart's ligament to its iliac termination which defines the point precisely.

14. **Elbow*: anatomical landmark: the radio-humeral articulation.

15. **Wrist*: anatomical landmark: the tip of the styloid process of the radius.

16. **Tip of the middle finger*.

17. **Knee*: anatomical landmark: upper border and edge of the inner tuberosity of the head of the tibia.

18. **Ankle*: anatomical landmark: tip of the internal malleolus.

19. *Span*: the subject is placed against a wall, the arms extended horizontally, the palms of the hands directed forwards. Measure the distance between the tips of the middle fingers of the two hands.

If a wall is not available, the rigid anthropometric rod is to be placed behind the subject, who assumes the position described in the preceding paragraph. The same measurement is to be made.

In either case, the *maximum* span of the subject is to be recorded.

20. **Bi-acromial diameter*: maximum distance between the two acromial points (cf. No. 11).

21. **Bi-humeral diameter*: maximum distance between the two prominences formed by the deltoid muscles. Secondary measurement.⁴

22. **Bi-mammillary diameter*: distance between the two nipple-points (cf. note appended to No. 5). Secondary measurement.

23. **Bi-cristal diameter*: maximum distance between the external margins of the iliac crests. In making this measurement, the observer is to direct the arms of the sliding-compass obliquely downwards, and from before backwards.

24. **Bi-spinal diameter*: measured between the two anterior superior iliac spines (cf. No. 13 *supra*).

25. **Bi-trochanteric diameter*: maximum distance between the external surfaces of the great trochanters. In making this measurement the superficial tissues are to be strongly compressed.

26. **External conjugate (antero-posterior) diameter of the pelvis*: anatomical landmarks: in front, the superior margin of the symphysis pubis in the middle line: posteriorly, the tip of the spinous process of the fifth lumbar vertebra.

27.⁵ **Transverse diameter of the thorax (No. 1)*. This measurement is to be made in the horizontal plane at the level of the base of the ensiform cartilage. The observer is to record the mean of the measurements taken at the extremes of inspiration and of expiration respectively: alternatively, the measurement may be made in the intermediate stage as regards those two phases of respiration.

28. **Transverse diameter of the thorax (No. 2)*. This measurement is to be made in the horizontal plane at the level of the upper border of the fourth chondro-sternal articulation. The same observation (as to the phases of respiration) applied here as to No. 27 *q.v.* Secondary measurement.

29. **Antero-posterior diameter of the thorax (No. 1)*. This measurement is to be made in the same horizontal plane as is defined in the case of the transverse diameter of the thorax No. 1 (cf. No. 27). The same observation (as to the phases of respiration) applies to this measurement as to No. 27 *q.v.*

30. **Antero-posterior diameter of the thorax (No. 2)*. This measurement is to be made in the same plane as is defined in the case of the transverse diameter of the thorax No. 2 (cf. No. 28). The same

⁴ A certain number of measurements are thus described in accordance with the instructions of the Commission.

⁵ In making measurements Nos. 27 to 30 inclusive, care is to be taken that the extremities of the calliper-arms are wide, since with the ordinary pointed arms there is a danger of error owing to the points slipping on to an intercostal space.

observation (as regards the phases of respiration) applies to this measurement as to No. 27 *q.v.* Secondary measurement.

31. **Sternal height*: measured with sliding callipers: from the supra-sternal notch (cf. No. 4 *supra*) in its deepest part, to the base of the ensiform cartilage.

32. *Bi-condylar diameter of the humerus*. Secondary measurement.

33. *Bi-styloid diameter of the fore-arm*. Secondary measurement.

34. *Bi-condylar diameter of the femur*. Secondary measurement.

35. *Bi-malleolar diameter*. Secondary measurement.

36. **Thoracic circumference*: this circumference is to be measured in the horizontal plane, passing through the base of the ensiform cartilage. The same observation applies here as to No. 27. Secondary measurement.

37. *Circumference of the neck*. Secondary measurement.

38. *Circumference of the upper arm*. The maximum circumference obtained *below* the insertion of the deltoid muscle, the arm being held in the position of rest.

39. *Circumference of the upper arm with the biceps muscle in the contracted state*. Proceed as in the case of No. 38. Secondary measurement.

40. *Maximum circumference of the fore-arm*. This measurement is to be made in the region of the epitrochlear and epicondylar muscles and extensors, *i. e.*, immediately below the joint-level.

41. *Minimum circumference of the fore-arm*. This measurement is to be made above the level of the styloid processes of the radius and ulna.

42. *Maximum circumference of the thigh*. This measurement is to be made at the level of the gluteal fold.

43. *Minimum circumference of the thigh*: measured above the level of the knee-joint.

44. *Circumference of the calf of the leg*: the maximum value.

45. *Minimum circumference of the leg*. This measurement is to be made above the level of the malleoli.

46. *Minimum circumference of the waist*. This measurement is to be made at the level of the most constricted portion of the abdomen.

47. *Contour of the hand*. The right hand is applied to a sheet of paper, the fingers being very slightly separated, and the axis of the middle-finger forming a prolongation of that of the fore-arm. The two ends of the bi-styloid line are to be marked by pencil dots. Starting from these points the contour of the palm and fingers is to be traced

with a pencil split longitudinally and held vertically. Special dots are to be added, marking (a) the extreme ends of the interdigital clefts, and (b) on each side, the position of the metacarpo-phalangeal articulations.

48. *Contour of the foot.* The right foot rests on a sheet of paper, the leg being perpendicular to the plane of this surface. Draw four short lines to mark the positions of the ends of the malleoli, and of the metatarso-phalangeal articulation of each side. Then the contour of the foot is to be traced in the same way as described for the hand (cf. No. 47). The extreme end of each interdigital cleft is to be marked by a dot. It is useless to trace the inner border of the foot between the malleolar point and the metatarso-phalangeal point, for this part of the tracing is always unreliable.

49. *Height of the plantar arch.* The foot being placed in the position requisite for tracing its contour (cf. No. 48), the vertical distance is to be measured between the plane of support and the upper border of the navicular bone. Secondary measurement.

IV.

The Commission and the Congress also adopted unanimously the following proposal and resolutions:

(a) *For the reconstruction of the stature from observations on the long bones of the skeleton.*

For the reconstruction of the stature with the aid of the long bones, the maximum length shall be measured in all cases save in those of the femur which is to be measured in the oblique position, and the tibia which is also to be measured in the oblique position, the spine being excluded.

(b) The Commission wishes to state that it is desirable that in the graphic representation of cranial forms, either the plane of Broca or of the Frankfort Agreement should be employed by anthropologists.

(c) The Commission holds that it is desirable that anthropologists should append complete lists of measurements to their publications.

(Signed)

W. L. H. DUCKWORTH

(One of the Recorders of the
International Commission).



SPECIAL COMMUNICATIONS AND REPORTS

ANTHROPOLOGY IN POST-BELLUM RECONSTRUCTION

While the war has stimulated activity in many scientific fields it has been a powerful check in others. Anthropology is one of these. The time has now come for a rebound. The temporary repression will probably result not only in a speeding up of anthropologic activity but also in changes of direction of effort and in new points of view. The need of international coöperation long ago made itself felt. At Spezzia, Italy, in 1865, there was created an "International Congress for Prehistoric Studies." This Congress first met at Neuchâtel, Switzerland, in 1866. The following year the Congress was held in Paris under the name "International Congress of Prehistoric Anthropology and Archeology," a name which it has since retained. The International Congress of Americanists held its first session at Nancy in 1875. In July, 1912, the first International Congress of Eugenics was held in London.

The Eighteenth International Congress of Americanists was held in London, May 27—June 1, 1912. Immediately following this Congress (June 4), an international conference was called in London by the Royal Anthropological Institute of Great Britain and Ireland, at which it was voted to organize an international congress of the anthropological sciences (exact title to be chosen later), which shall work in affiliation with existing related congresses. An organizing committee was appointed, of which Dr. A. P. Maudslay was made president, and R. R. Marett of Oxford, Secretary. Later at the Fourteenth International Congress of Prehistoric Anthropology and Archeology held in Geneva, September 9-14, 1912, the work of this organizing committee was recognized by the passage of the following resolution: "Resolved that this congress enter into amicable relations with an international congress now in process of formation and destined to cultivate particularly the field of ethnography and physical anthropology."

Shall we build upon those ante-bellum foundations? Or shall we start afresh and along somewhat different lines, as indicated in the appended proposition from the officers of the Paris School of Anthropology:

PARIS, December 5, 1918.

"Dear Colleague:

"We have the honor to send you herewith a copy of a circular, addressed to the anthropologists of the allied nations.

"It is not necessary to insist on the importance of the work for which we bespeak your coöperation. We are even convinced that you are willing to make every effort

to bring the plan to the notice of institutions and persons of your country with the view of enlisting their help.

"Please accept, dear colleague, the assurance of our high and cordial consideration.

(Signed as below)

"PARIS, November 20, 1918.

"*Dear Colleague:*

"The Paris School of Anthropology appeals to the Anthropologists of all the Nations that are combined for the defense of Civilization. Convinced that the military victory of the Allies is only the preface to a magnificent collaboration in the future, the School proposes to organize a *Common Center of Action*, which will prepare and assure a renewal of activity among the anthropologic sciences and develop in them the taste for disinterested research, independence of thought, and intellectual and moral values which they would have lost under the nefarious influence of Germany.

"The terrible crisis which has overtaken humanity may become a fruitful lesson, to those who are able to observe and profit by its experiences.

"It has unveiled the spirit of knavery and servility of German science, its false erudition, its shameless commercialism, its cleverness in twisting theories and even anthropologic observations, to suit the aims of German imperialism.

"It presents with a fulness they had never before attained problems of which a few examples will suffice to show their gravity: delimitation and relation among nationalities, peoples, languages, races, and centers of civilization;—eugenic questions bearing on the welfare of coming generations after the sufferings and hecatombs of the present war;—questions of demography and of the birth-rate crisis among the most civilized peoples;—questions bearing on the rôle and evolution of religious ideas;—questions of political organization varying according to races and traditions;—and social and economic evolution and regressions;—racial and ethnic aptitudes revealed by the war;—persistence and transformations of national antagonisms;—dangers and advantages of crossings among different races, etc.

"All these problems have for years attracted the attention of anthropologists, who alone can grasp them in all their complexity, in an objective way, wholly preoccupied with a search for truth.

"But this work, so necessary, can be accomplished only through a close and constant collaboration among serious-minded men belonging to the Nations that have just shown in such a striking manner their moral grandeur and civilizing power.

"*Therefore the Paris School of Anthropology believes it should take the initiative in the proposition tending to group, orient and centralize all the efforts of the men preoccupied with these questions.*

"The School feels that it has here a certain right and that it can take the initiative without temerity:

"In France, under the impetus of Broca, beginning in 1859 was organized the first center of anthropologic research, and (later) systematic instruction, both of which remain to this day completely free and absolutely autonomous according to the spirit of the founder.

"In view of these considerations, Sir, we have decided to submit to you the following propositions:

"It would be desirable to found a permanent *International Institute of Anthropology* including all anthropologists of the allied Nations having a *Permanent Central Office* with the following functions:

1. Organization of periodic sessions;
2. Facilities for relations among the research workers by the centralization of all the addresses, stating the specialties of each; by notation and publication of requests and offers bearing on the subject of collections or libraries; by information of every sort given on the spot or by correspondence;
3. Centralization of the organs of anthropologic publications;—of current reviews, journals, books and pamphlets systematically classified;—bibliographic notices;—duplicates of all kinds;
4. Organization of an ensemble plan of anatomic research with a view of throwing light on the double problem of human adaptation and the phyletic relations of man with the higher mammals;
5. Systematic organization of ethnographic exploration;
6. Organization of anthropologic inquiry according to ensemble plans;
7. Attitude of Nations one toward the other.

"The functioning of such an institution is difficult to establish; it raises questions of personnel, of a site, of a budget, the importance of which you will readily understand.

"Nothing can be done without a preliminary agreement.

"Therefore, Sir and honored Colleague, we urgently beg of you to answer:

1. If these ideas appeal to you as right;
2. If, after the conclusion of peace, you would attend a *Preparatory Congress*, at which the bases and means of the prospective organization might be discussed.

"In case of your personal inability to attend, you or your institution could be represented by a Delegate.

"The date of this *Preparatory Congress* would be announced to you later.

"Kindly let us know the date that would best suit your convenience.

"Please accept, Sir and honored Colleague, our best fraternal sentiments.

(Signed) *The Director YVES GUYOT*

Assoc. Director . . . H. WEISGERBER

*The Professors . . . R. ANTHONY, L. CAPITAN, G. HERVÉ,
P.-G. MAHOUEAU, L. MANOUVRIER,
A. DE MORTILLET, G. PAPILLAUT,
F. SCHRADER, J. VINSON, S. ZABOROWSKI.*

"Kindly address responses to the Director of the *École d'Anthropologie*, 15 rue de l'École de Médecine, Paris, France."

The plans that were in process of formation prior to the outbreak of the war were a logical outgrowth of the then existing conditions and contemplated no sweeping innovation. They were intended as a supplement to existing agencies and as a bond of union among them. In them the problems of personnel, pied à terre, and budget were not of a serious nature. On the other hand in the proposition of the Paris School of Anthropology calling for a permanent International Institute of Anthropology, these matters are of commanding importance.

Their project is an ambitious one. Can it be made to justify itself? There would seem to be enough in the idea at least to justify the calling of a Preparatory Congress, which is precisely the first step we are invited to take.

GEORGE GRANT MACCURDY

IMMIGRATION IN 1918. BASED ON THE ANNUAL
REPORT OF THE COMMISSIONER GENERAL
OF IMMIGRATION, 1918

Immigration, already reduced to about 300,000 annually for the years 1915, 1916 and 1917, has been still further materially reduced by the entry of the United States into the war. During the twelve months ending June 30, 1918, only 110,618 immigrants were admitted to this country. The significance of this statement will be better appreciated when attention is called to the fact that we must go back in the history of immigration to 1862 before we find a year which shows a correspondingly low addition to our population by immigration. In 1862 only 72,183 immigrants were admitted. The four years preceding and the four years following 1892 likewise had a reduced number of immigrants but not since 1845 have we had such a small immigration extending over any considerable period. The contrast is equally great in numbers when we compare the 110,618 immigrants of 1918 with the 1,285,349 of 1907, the year in which the greatest number of immigrants were admitted.

The sources and distribution of our immigration in 1918 are summarized in the table on the following page.

From this table it will be seen that about 63 per cent of our immigration was made up of eleven immigrant races who settled in eleven states. With the exception of Illinois the states receiving the greatest number of immigrants are the more readily accessible coastal and border states. Marked differences are also apparent in the sources of immigration. It is rather unusual for the Mexicans, Japanese and Spanish to rank so high and on the other hand for the South Italian, Irish and Hebrew to be so unimportant numerically. As a matter of fact Mexican and Japanese immigration have actually increased slightly during the period of war.

With immigration at such a low ebb, emigration becomes a more important factor. If we deduct the number of emigrants departing in 1918 from the number of immigrants admitted we find a net increase in population of only 18,585. Emigration exceeded immigration in the following races: Armenians, Bohemians, Bulgarians, Chinese, Cubans, English, Greeks, South Italians, Magyars, Poles, Portuguese, Russians, Slovaks and Turks. The states losing the greatest numbers were Texas, New York, Massachusetts, Michigan, Pennsylvania, California, Illinois, Minnesota, Ohio, New Jersey, Connecticut and Florida.

IMMIGRANTS TO THE UNITED STATES, ACCORDING TO NATIONALITIES, IN 1918

States of Intended Residence	Immigrant "Race"					
	Mexican	English	Japanese	Scandi- navian	Spanish	French
New York	436	2,625	603	2,508	3,877	1,411
Texas	11,661	111	23	25	183	50
California	1,666	1,220	4,164	714	405	233
Massachusetts	24	2,189	44	418	164	1,495
Michigan	20	1,586	10	207	27	326
Washington	3	622	1,202	439	13	104
Pennsylvania	57	348	23	328	411	105
Hawaii	0	23	2,856	6	0	1
Illinois	76	379	60	617	50	88
New Jersey	44	232	5	237	359	108
Arizona	2,067	26	23	10	213	8
Total for 11 States	16,054	9,361	9,013	5,509	5,702	3,929
Total for all States	17,602	12,980	10,168	8,741	7,909	6,840

States of Intended Residence.	Immigrant "Race"						
	Negro	South Italian	Scotch	Irish	Hebrew	Total of 11 Immi- grant "Races"	Total for all Races
New York	3,528	2,211	826	1,070	1,650	20,745	27,384
Texas	4	7	25	32	15	12,136	12,288
California	28	131	396	294	184	9,435	12,098
Massachusetts	689	464	1,186	672	166	7,511	9,638
Michigan	52	203	715	771	269	4,186	5,895
Washington	4	46	331	201	65	3,030	3,652
Pennsylvania	139	542	100	196	214	2,463	3,514
Hawaii	0	0	13	8	0	2,907	3,100
Illinois	30	226	166	160	266	2,118	2,748
New Jersey	229	448	237	79	112	2,090	2,637
Arizona	0	2	13	6	—	2,368	2,430
Total for 11 States	4,703	4,280	4,008	3,489	2,941	68,989	85,384
Total for all States	5,706	5,234	5,204	4,657	3,672	88,713	
Total immigration							110,618

There has been a considerable change in the sex ratio of our immigrants also. The ratio for all our immigrants was three males to two females. Among emigrants the ratio was three to one. As usual there was a preponderance of females among the Irish, Scotch, English and Koreans. There was also a preponderance of females among our South Italian and Hebrew immigrants. The sexes were equal among the Negroes, French, North Italian, Japanese and Magyars. In all our other immigrant groups there was a preponderance of males.

3.3 per cent of the immigrants applying were rejected. 23 per cent of these rejections were due to the working of our new immigration legislation. As usual, however, the greatest number were rejected for

economic reasons. Following this, inability to read, contract laborers, contagious diseases, and physical or mental deficiencies, in the order named, were the most important factors in exclusion. The most common pathological causes for rejection were general defects, internal and genito-urinary diseases, nervous and special sense disturbances, diseases of the skin and its appendages, and diseases of the blood and circulatory system.

In view of the proposed legislation to restrict immigration from all European countries it may be of interest to call attention to the fact that such legislation would fail to attain its purpose unless similar laws were enacted in Canada. The importance of Canada as a source of European peoples is shown in the following table. The percentage of the total immigration from each national group entering the United States by way of Canada is given below:

ALL RACES 29 %		
Scotch	89 %	Poles 67 %
Ruthenian	85 %	Welsh 67 %
English	84 %	German 67 %
French	84 %	Bulgarian 60 %
Irish	80 %	Croatian 50 %
Magyar	75 %	Roumanians 50 %
Bohemian	71 %	Dutch 33 %
		Finns 33 %
		Hebrew 33 %
		Russians 33 %
		North Italians 20 %
		Armenians 17 %
		Scandinavians 14 %
		South Italians 10 %

LOUIS R. SULLIVAN

NOTES ON THE PEOPLES OF BURMA, 1917-1918

Races of Burma:

The province of Burma, with the dependent protectorates—the Shan and Karen States and the Kachin and Chin Hills—has an area of 262,616 square miles and a population (census of 1911) of 12,115,217. On the basis of language this population was made up of the following groups:

Indigenous Races:

Burmese (including Arakonese)	8,317,842
Karens and other related people	1,067,363
Tai or Shans	968,375
Chins	296,912
Kachins	170,144
Talaings	179,443
Malays	6,061
Others	232,225
Total, Indigenous	11,238,265

Alien Races:

Indian—Dravidian.....	249,568
Indian—Aryan.....	490,063
Chinese.....	108,877
Other Asiatics.....	3,140
Europeans (including Americans and Eurasians).....	25,204
Total, Aliens.....	876,852
Grand Total.....	12,115,217

To the anthropologist and the philologist, there may be deep racial and linguistic differences between the various indigenous races of Burma; but to the superficial observer, Burmans, Karens, Shans, and Talaings look like the same people; and they are apparently closely related to their neighbors on the East—the Siamese and Laotians. Indeed the Karens are classed as a Siamese tribe and the Tais (Shans) of the Shan States are regarded as identical with the Tais (laotians) just across the Mekong in the French Protectorate of Laos. The Chins and Kachins are different people. Although they are supposed, like the rest of the Burmans, to be a Tibetan origin, they bear a much closer resemblance to the Mongolian tribes of northern Asia and Siberia. They occupy the hills and villages of the frontiers of northern and northwestern Burma and are quite uncivilized.

LAWRENCE P. BRIGGS,
U. S. Consul

RANGOON, BURMA, INDIA, September 11, 1918

SOME OBSERVATIONS ON DISEASES AND MENTAL CHARACTERISTICS OF APES

The underneath is an extract from a most interesting letter received a short time ago by the Editor from Mr. R. L. Garner, since 1917 with a Smithsonian expedition at Fernan Vaz, Gabon, French Congo. Mr. Garner is doubtless one of the most experienced and ablest living observers of animal life, and particularly of that of the monkeys and apes in French Congo.—Ed.

"I am exceedingly anxious about one of our shipments for it contains a thoroughly well preserved and prepared specimen (skin and skeleton complete) of what I believe to be a species of the anthropoid ape hitherto unknown to the scientific world. It is certainly one of the rarest types in Africa and I have been in search of this ape for more than fifteen years. I have seen two living specimens of it and had descriptions of it from three or four white men, among whom was a very intelligent missionary priest, well up in zoölogy and especially interested in the *simiidae*. . . .

"I will call your attention to a singular fact about the monkeys and especially of the mangabeys (*Cercocebus*) of this region. There appears to be prevalent among them some kind of disease resembling

lupus or cancer and it is not at all unusual to see one with his nose eaten away or sometimes one side of his face, while otherwise he appears active and normal. An isolated case now and then might be attributed to accident or to violence; but these cases are so common as to lead to the belief that it is a disease and, so far as I have observed, it appears to be confined to this one species, with the exception of one case in which I noticed the *mustache* monkey (*Cercopithecus cephus*) affected by it.

"Another bit of ape lore. I have a fine young chimpanzee who has just about got well of something so much like whooping cough among human children, that I have a suspicion that it really was that. It was not a case of bad cold or ordinary cough but every phase and symptom resembled those of whooping cough.

"He has also been much afflicted by some kind of very bad cutaneous disease and nearly all his hair has fallen away. His skin wrinkles up in great folds and looks that like of a pachyderm. His epidermis has all peeled off in flakes and the process attended by the most intense itching and irritation. In the meantime, although his appetite and his spirit remained normal, he has lost several pounds in weight and his hide is now about three sizes too big for him.

"My domicile is located on the edge of a vast plain traversed here and there by belts and spurs of forest. In those plots of bush live great numbers of chimpanzees and for the first time in my long experience among them, I have seen whole families of them out on the open plain. Frequently they cross the plain from one belt of bush to another, in some places a mile or so in width and not a tree or bush in that distance to shelter them from attack. They often come within 200 to 300 yards of my house and sometimes manifest deep interest in trying to find out what this new thing is, set up in their midst. I have seen as many as four or five different groups of them in the same day and one of these contained 11 members. One very old man has come, on two occasions, within 100 yards of me and scrutinized me very closely, while his wife (as I took his companion to be) appeared to be very uneasy and suspicious. On several occasions I have seen the young ones romping and tumbling about on the grass, chasing and scuffling with each other, exactly as you see human children do.

"A school of them slept, a few nights ago, within less than 100 yards of my house, in a very small clump of bush, not more than a hectare in extent, on one side of which is the lake and all around the rest of it an open plain, with the quarters of my crewmen not more than 200 yards away on the opposite side from me and a native village in plain view 500 yards away at an angle of about 30° from the crewmen's village.

"I have never seen before so many chimpanzees as I find here and I have never seen them so indifferent to the presence of human beings. Even while I was building and had as many as 18 or 20 natives moving about the place, those reckless apes would often cross the open plain in full view and with apparent composure. . . .

"Your studies of physical anthropology of course must convince you of the undeniable consanguinity of men and apes, as animals derived from a common source: and my studies of the psychic unity of the two species convince me of their mental affinity as different editions of the same text. Certainly the champion of the Mosaic story of the creation of man has got a lot of stumps in his row; and the psychologist who attempts to define the line between the realms of *animal psychics*, as they call it, and *human psychics* has to be a skillful hair-splitter to make up his case.

R. L. GARNER

THE HUMAN LOSSES OF THE WAR

According to the latest available data on the human losses in the war, these were as follows:¹

UNITED STATES

Deaths during the war in the American forces from all causes, numbered, according to an announcement made February 24, 1919, by the War Department, 107,444.

In the expeditionary forces the total deaths were 72,951. Of these, 20,829 resulted from disease, 48,768 from injuries received in battle and 3,354 from all other causes.

Deaths from disease among the troops in the United States totaled 32,737, and from other causes, 1,756, giving a total for the troops in this country of 34,493.

The figures for the expeditionary forces cover the period from April 1, 1917, to February 16, 1919; those for the troops in the United States from April 1, 1917, to February 14, 1919.

The deaths from disease exceeded the total battle casualties by more than 5,000.

GREAT BRITAIN

In the British armies, not counting in the Colonials, the total killed, died of wounds and died of disease during the war was, according to an announcement published in the *British Medical Journal* of November 23, 1918, 677,704. In addition there were 80,000 missing, not prisoners. The wounded numbered 2,032,142. Among the dead 5.76 per cent were officers, 94.24 per cent other ranks.

FRANCE

The French losses, including those of the colonial troops, totaled, according to an official report of December 27, 1918, 1,831,600 known

¹ The JOURNAL is indebted for a large part of these data to the Office of the Surgeon General U. S. A., the Official U. S. Bulletin, the War Department, and the Italian Embassy. The figures probably in no case are final, but the modifications to be expected can hardly be material.

dead, from all causes, among which 2.3 per cent were officers; besides which 314,000 were missing.

ITALY

The latest data at the disposal of the Italian Embassy in Washington indicate that the total number of dead in the Italian armies amounted to 462,390; of which killed in battle or died of wounds, 332,000; and died of diseases, at home and as prisoners, 130,390.

SMALLER COUNTRIES

Canada

The total deaths from all causes in the Canadian forces during the war amounted to 60,383 (Off. Bull., February 2, 1919).

Australia

Australia's dead soldiers, according to data of October 29, 1918, were 54,431.

Bulgaria

The killed and missing of the Bulgarian armies, according to data issued at Sofia, January 6, 1919, totaled 101,224; the wounded 1,152,399. The dead do not include however the many who perished of influenza, exhaustion or famine after the defeat in Macedonia.

A. H.

LITERATURE

EVOLUTION; MAN'S ORIGIN; EARLY MAN

ANCIENT HAWAIIAN THEORIES AS TO THE NATURE AND ORIGIN OF THINGS. By Curtis (Mattoon M.), in Thrum's Hawaiian Manual for 1919, 79-93.

Professor Curtis in his well written article points to the fragments of "evolutional cosmogonies" in Polynesia and especially Hawaii. So far as man is concerned, however, his origin while placed in the proper sequence is not referred to any animal form.

THE ORIGIN AND MAINTENANCE OF DIVERSITY IN MAN. By Newbigin (Marion I.)—*Geogr. Rev.*, Nov., 1918, 411-420.

A dissertation. The author attempts to show "That the direct and slow process of adaptation to diverse environments which occurs among animals today, as it must have occurred in a precisely similar fashion among primitive men—the process which produced geographical races among men—is now of little significance in human life." While in the second place he "wishes to suggest that the place of this process, in producing and maintaining human diversity, has been taken by another, more direct and far more rapidly produced form of adaptation." This other process consists of the human adaptive response to environment—meaning evidently more the sociological than biological reaction. It is this response, the author believes, which "produces evolution in civilized man, or in other words, leads to increased fitness to survive."

UNICITÀ DEL PHILUM UMANO CON PLURALITÀ DEI CENTRI SPECIFICI. By Giuffrida-Ruggeri (V.)—*Rev. Ital. Paleont.*, 1918, xxiv, 3-11.

The family *Hominidae* is so uniform, both physiologically and anatomically, that vague polyphyletic ideas (*divagazioni polifiletiche*) cannot appropriately be applied to it. Its origin, as recently outlined by Lull and Gregory, was probably due to some circumstance which forced a species of arboreal, frugivorous, great apes to adopt terrestrial and omnivorous habits. The anatomical changes needed to effect the transformation seem relatively unimportant. After the completion of these changes man began to migrate eastward and westward from his hitherto restricted "central-Asiatic" range, probably following as a hunter the movements of animals of the chase. As a relic of these early human beings we have the Heidelberg jaw. Later, man pushed to the south, producing the cycle of tropical races. The nucleus of the *Hominidae* left behind him in central Asia went on differentiating into still another cycle, that of the northern races, the prin-

cipal subdivisions of which are the "leucoderms" and "xanthoderms." The human phylum thus remained simple until the geologically recent times during which the known diversifications of type have taken place.

Professor Giuffrida-Ruggeri contrasts his conception of human evolution (of which the foregoing is intended as a summary) with that of Vogt, Klaatsch and others which would carry the ancestry of different human races back to different simian stocks, and with that of Wood-Jones which would carry it back to extremely primitive primates without passing through any true simian stage. Both of these rejected hypotheses he alludes to as "polyphyletic," thus confusing under one word two antagonistic ideas. The paper contains much suggestive criticism of recent speculations on the origin of man; but its author makes no attempt to answer the forcible argument of Wood-Jones to the effect that the ease with which the anatomical transition might be made from an arboreal anthropoid to a terrestrial man is more apparent than real.—G. S. MILLER.

THE THEORY OF ENVIRONMENT. Part I. An Outline of the History of the Idea of Milieu, and its Present Status. By Koller (Armin Hajman, Ph.D.)—12mo., Menasha, Wis., 1918, 104 pp.

The idea that man's characteristics and the course of human affairs are influenced by the environment in which groups of men live, may be traced back to Hippocrates and the Hebrew prophets. Doctor Koller gives a detailed account of the development of this conception from the early beginnings to the present time. He "traces the semasiology and use of the word *milieu* and discusses the English and German equivalents 'environment' and 'Umwelt.' An historical sketch of the milieu idea is then taken up from the very beginnings to the nineteenth century." The biological side of the question receives, however, but little attention. The bibliography is copious, but its value is lessened by the absence of classification and by the abuse of the abbreviations "Ibid." and "l. c." (Example, p. 52: "Cited by Achelis, l. c., p. 84"; three persons experienced in the use of books averaged four minutes in finding the meaning of this cryptogram, hidden on page 27.)—G. S. MILLER.

THE EVIDENCE AFFORDED BY THE BOSKOP SKULL OF A NEW SPECIES OF PRIMITIVE MAN (*Homo capensis*). By R. Broom, *Anthropological Papers Amer. Museum of Nat. History*, 1918, xxiii, Part II.

The finding of a new species of any animal is an important matter; the discovery of a new species of *Homo* is a scientific event of the first importance. Has this feat been accomplished in the case of the Boskop skull, found some four years ago in a surface laterite deposit of the Transvaal, South Africa? The skull, found by a farmer while digging a trench, is fragmentary, consisting of the greater part of the frontal and parietals with a small portion of the occipital. Later excavation at the same spot yielded a portion of the right temporal, most of the left horizontal ramus of the mandible, and some fragments of limb bones.

The depth at which the bones are supposed to have occurred is about four and a half feet. They all belonged presumably to one individual and in view of their number might represent a burial, hence are not necessarily so old as the deposit in which they were found. There were no associated fossil remains or artifacts; so that the age of these fragments and their title to rank as the type of a new species of man must rest alone on their physical characters. What are these characters?

In Broom's opinion they are out of the ordinary because of their great size: skull length 210 mm., breadth 160 mm., height 148 mm., capacity 1,980 ccm., and powerful lower jaw with incisors and canines much larger than those in modern man; hence a new species of man for which he proposes the name *Homo capensis*. If the above were measures in the true sense there might be some reason for his conclusion, but they are simply estimates. The skull was not complete enough to obtain the antero-posterior diameter; even if it had been the unusual figure of 210 mm. might still be due to a post-mortem spreading of the sagittal arch. Likewise would a slight spreading of the transverse arch lead to erroneous conclusions as to the breadth of the skull. That such is the case is apparent from the reproduction of the normal occipitalis published in *Nature* (August 5, 1915) and later by Haughton.¹ G. Elliot Smith, to whom an intra-cranial cast was sent, thought it to be "relatively remarkably flat" in view of the great breadth of the skull. Would it not be safer to assume a post-mortem flattening of the skull cap rather than that a new human type with enormous head had been discovered?

As to the lower jaw fragment, Haughton called it "small and akin in characters to that of the Bantu or Bushman type." Judging from the half tone accompanying the paper by Broom reproducing the fragment of the mandible natural size, the Boskop lower jaw does not differ from the average human lower jaw. The author is correct in calling the only tooth present the second molar, but it is no larger than any other well-developed second lower molar. Then why should he assume that the missing canine and incisors were "much larger than those in modern man"? He gives the greatest diameter of the canine socket as 9 mm., and questions whether "this large socket has been formed by the root of a tooth or very largely by pyorrhœa." The latter of course might be the case, but it is not necessary to invoke a pathological condition in order to account for the socket's amplitude. In a collection of Inca skulls, for example, I have no difficulty in finding lower canines with a maximum diameter of 9 mm. No importance need be attached to the fact that the canine was twisted on its axis, and hence not set with its greatest diameter transverse to the jaw. The distance from the anterior margin of the canine socket to the plane of the symphysis proves likewise that the Boskop incisors were not of unusual size.

Thus the characters on which the author relied to build up a new species of *Homo* do not seem to have any basis in fact. Would it not

¹ *Trans. Royal Soc. of South Africa*, vi, Pt. I, 1917.

be better therefore to withhold the use of the term *Homo capensis* until a less "annoyingly imperfect" specimen shall have been found in South Africa?—GEORGE GRANT MACCURDY.

ONTOGENY

THE DETERMINATION OF SEX. Note, *Brit. Med. J.*, 1918, 326.

A brief abstract of a publication by Ada Nilsson in the *Svenska Läkarsällskapets Förhandlingar*, December 31, 1917, dealing with the results of recent observations on certain determining factors of sex by German physicians. In families of German soldiers visiting their homes on short furlough, it appeared that intercourse during and for several days after menstruation was followed in a large majority of cases by male conception, while the reverse was the case when the intercourse took place from the fifteenth to the twenty-second day after the commencement of the menstrual flood. From the twenty-second to the twenty-eighth day the women were nearly sterile. The optimum period for conception was found to be the seventh and eighth day after the beginning of the menstrual flood.

SEX RATIO AND SEX DETERMINATION. By Ewart (R. G.)—*Brit. Med. J.*, 1918, 358-359.

Contests conclusion on the subject of sex determination advanced by Dr. Siegel (*Brit. Med. J.*, Sept. 21, 1918). "What has been discussed in Dr. Siegel's work would seem to be a question of sex ratio, arising in all probability from the slightly different gestation periods for the male and female." Nevertheless Dr. Siegel's contribution is acknowledged to be of importance, as it is possibly the first occasion on which a statistical attempt has been made to accurately estimate the period of gestation in man.

THE OSSIFICATION CENTERS OF THE FETAL PELVIS. By Adair (F. L.)—*Am. J. Obst.*, N. Y., 1918, LXXVIII, 175-199.

Study on a series of specimens extending in age from 56 to 167 days. Conclusions:

"I. The first ossification center of the pelvis to appear is in the ilium about the 60th to the 65th day of fetal life in embryos with a C. R. length of from 30 mm. to 35 mm. There are no separate secondary centers.

"II. The median center of the first sacral vertebra is the next to appear about the 74th to 76th day in embryos having a C. R. length of 51 to 52 mm.

"III. The lateral sacral centers first appear when two or three median centers are present, in embryos eighty to eighty-two days old having a C. R. length of 65 mm.

"IV. The ischial center appears about the 94th to 98th day in embryos whose C. R. measurement is from 88 mm. to 100 mm.

"V. The pubic center is present on the 129th day in an embryo with a C. R. length of 150 mm. At this time all other centers which

appear, until just prior or subsequent to birth, are usually apparent.

"VI. Practically all antenatal pelvic ossification centers are evident by the end of the 19th week of fetal life."

THE JEWISH CHILD. By Feldman (W. M.)—8vo, London, 1917, XX, 453 pp.

A mixture of many interesting medical and sociological facts, delightful old Jewish stories, and bad anthropology. Perhaps the most valuable chapter of the book is the last one, which deals, though in brief and imperfect manner, with "the biostatic and physical characters of the modern Jewish child." A good book, for the more sedate, for the long wintry evenings.

VARIATION: RACIAL; INDIVIDUAL

THE HEIGHT, WEIGHT AND CHEST MEASUREMENTS OF HEALTHY CHINESE. (Report of the Research Committee of the China Medical Missionary Association, G. Duncan Whyte, Chairman.)—*China Medical Journal*, May and July, 1918, XXXII, Nos. 3 and 4, 210-216, 322-328.

This report is a very brief statement of the results of an organized attempt to determine the normal measurements for healthy Chinese, chiefly on account of their value from the medical standpoint. Twelve members of the association, living in different parts of China, have cooperated and data has been collected in regard to 1,691 individuals, which in addition to 2,523 recorded in the literature and utilized in the report, make 4,214 in all. This material is divided into four classes: adult and adolescent males, and adult and adolescent females. Since the report is so greatly condensed the actual methods of measurement are not described so that we have no means of knowing whether the international anthropometric agreements have been followed, and mention has not been made of the occupation or race (Chinese, Manchus, etc.) of the individuals examined.

A number of interesting observations are recorded. It is found, for instance, that adolescent males in Peking are, on an average 3 inches taller than those inhabiting the South of China. The average weight of adult males in South China is 119 lbs., which is considered an important point in the dosology of drugs; for the adult doses, as listed in the home pharmacopœias, are intended for individuals of 150 lbs. "Of some 250 pupils in the Swatow Anglo-Chinese College the average gain per pupil during the winter months was $7\frac{3}{4}$ lbs. (3.5 kilos); whereas during the six summer months it was only 5 oz. (142 gms.) and 40 per cent were found to have actually *lost* weight during that time." In estimating physique, considerable care is devoted to a determination of Pignet's factor, which has been calculated "by deducting the circumference of the chest in centimeters (after full expiration), plus the weight in kilogrammes, from the height in centimeters." In 60 per cent of 500 individuals this factor is found to be over 35. This means that in a comparison with other races Russian recruits may be

roughly classified as "very strong," soldiers of the Indian army "medium," British recruits "weak" and Chinese civilians as "very weak." Much importance is paid to the value of Pignet's factor in ascertaining the normal for different localities and in estimating the beneficial effect of training and improved hygienic conditions. Detailed observations are to be found in the tables at the end of the report.—E. V. COWDRY.

RACIAL TYPES IN THE PHILIPPINE ISLANDS. By Sullivan (Louis R.)—*Anthr. Papers*, Am. Mus. Nat. Hist., N. Y., 1918, XXIII, Pt. I.

Since 1885 anthropological data on the inhabitants of the Philippine Islands have been accumulating. A review of the data has just been completed by Louis R. Sullivan. Numerous scattered observations are brought together in an attempt to indicate racial affinities. While the author offers an interpretation his chief aim has been to present the material in a form that will enable the reader to draw his own conclusions.

The Philippine problem is a part of the larger Malay problem. The existence in the Islands of a Negrito group and a Malay group is recognized by all. Is there any justification for assuming that there is at least one other racial group? The author's comparisons are limited principally to stature, head form, form of the nose, and arm reach. For the sake of convenience the population is divided into Christian, Pagan, Mohammedan, and Negrito; it is of course recognized that the Negrito are also Pagan, but it seemed best to give them a distinct grouping. While the average stature of mankind is 165 cm., that of the Philippine Islanders is 158.5 cm. The head form of the Islanders is brachycephalic expressed by an average index of 82.2. The average nasal index is 85 (Christian 81, Mohammedan 86, Pagan 90, Negrito 98). The arm reach of the Negrito is relatively great; in every case it exceeds the stature. In summarizing the author concludes that there is a third racial type—the Indonesian. The bulk of the population of the Islands then is included under three racial types: (1) Malay with distinctly Mongoloid affinities comprising about nine-tenths of the total; (2) Indonesian, next in point of numbers, with Mongoloid affinities but in lesser degree than the Malay type; and (3) Negrito with Negroid affinities. Out of a total population in 1915 of 9,503,271, only 35,926 were Negrito. The presence of a pre-Dravidian type in the Philippine Islands as a distinct group is not revealed by the data at the command of the author.—G. G. MACCURDY.

FORMOSA. Photographs of the Aborigines of Formosa. 2 vols., fol., Japan; 1917(?).

Two large size volumes, containing hundreds of good portraits, etc., of the Formosan aborigines. Unfortunately, every designation and every particle of text is in Japanese and thus quite useless without an interpreter. The recent tendency of the Japanese to print only in their language and type, without any indications or abstract in one

of the European languages, presents a great difficulty to the non-Japanese student and is a serious disadvantage all around which calls for an early correction.

THE ISLAND OF FORMOSA AND ITS PRIMITIVE INHABITANTS. By Ishii (Shinji)—*Trans. Jap. Soc. Lond.*, 1917, XIV, 38-60, 16 pl.

Of value to physical anthropology through ethnographic notes and illustrations. No measurements or somatological observations. The natives, as far as can be judged from the portraits, approach in the main partly the Malay and partly the "paleo-Asiatic" subtypes of the yellow-brown people, and show various admixtures with Chinese, Indonesians and the Negrito. Negrito blood is especially apparent among the Yami on the offlying Kotosho Island, who have a tradition that they came from the Island of Batan in the Philippines and still speak the dialect of that island.

THE TRIBES OF NORTHERN AND CENTRAL KORDOFAN. By MacMichael (H. A.)—12mo, Cambridge, 1912, 259 pp.

The aim of the author has been to show "the antecedents of the tribes at present inhabiting the province in so far as any information upon the subject can be gleaned from extraneous sources or from current native tradition." Physical anthropology of the people is touched on but incidentally, but the portrait illustrations and ethnographic map are of value in this connection. In addition to which the following paragraph deserves to be quoted: "One ethnological fact, however, is certain, and as the truth of it applies with varying force to every tribe in the country, it is of primary importance to bear it in mind:—breeding from slave-women captured from the numerous black tribes of the south and west has for centuries affected the racial characteristics and status of the so-called Arbas to a very marked degree. Many of the sedentary population and of the Baḡḡàra could almost be called negroid in appearance; but the camel-owning nomads have preserved a greater purity of type."

VARIATION: LIMBS; SOFT PARTS

THE WEIGHT OF LIMBS.—Prof. A. Keith is quoted in the August 24, 1918, *British Medical Journal* as giving the following mean values of the weight of limbs and part of limbs in man:

The total weight of the upper extremity is 6.38, that of the lower extremity 18.6 per cent of the weight of the whole body. As to parts, the upper arm is 3.3, fore arm 2.28, hand 0.8, thigh 11.6, leg 5.2, and foot 1.8 per cent of the total body weight. These determinations will be of particular use to the manufacturers of artificial limbs.

Independent studies on the same subject, by a different method, have been carried on by Prof. Robert Bennett Bean, of the Anatomical Department, University of Virginia.

VARIATION: SKELETAL

OBSERVATIONS ON THE CANALIS BASILARIS CHORDÆ. By Schultz (Adolf H.)—*Anat. Rec.*, 1918, XV, 225-8, 1 pl.

"Out of twenty-two adult human skulls examined by the writer, a complete canalis basilaris chordæ seu medianus, which perforates the basioccipital bone in a sagittal direction, was found in two whites, and the same canal, partially closed, in one Filipino. In a material consisting of thirty-eight skulls (twenty-six negro and twelve white) of fetuses and infants, ranging in age from the eighth month of prenatal to the second month of postnatal life, the canalis basilaris, represented only by its posterior part, was found in four negroes and one white."

Historical matter and a discussion of the formation follow. The author is not inclined to regard atavism as a cause of the condition. "The canal is much more likely to occur in consequence of the coincidence of abnormal early or rapid ossification of the basioccipitale and the late disappearance of the chorda dorsalis."

OSTEOMETRIA PORTUGUESA: I. *Coluna Vertebral*. By Correa (A. A. Mendes)—*Ann. Acad. Polytechn. Porto*, 1918, XII; repr. 8vo, pp. 30.

This is the first report on the author's detailed study of forty ordinary Portuguese skeletons, well identified as to sex, age, birthplace and occupation—too small a series, regrettably, for definite conclusions. The results are interesting from both racial and sex standpoints, particularly as regards the sacrum, which relatively is exceptionally broad and short. A list of the individual measurements is appended. It is to be regretted that the painstaking work does not extend to at least 100 male and equal number of female Portuguese skeletons of a known derivation, so as to give us data which could safely be used as standards for comparisons.

A NEW FEMORAL INDEX. By Holtby (J. R. D.)—*Dubl. J. Med. Sc.*, 1918, 294-6.

The proposed new index is the Bi-condylar Width-Length Index:

$$\frac{\text{Bicondylar width} \times 1000.}{\text{Oblique length}}$$

It was found to average, *in males*, 12 longest bones—163; 17 shortest bones—174; and 12 average bones—171; while in females it was, in 8 longest femora—158; in 9 shortest—169, and in 12 average bones—165. From this it may be concluded that "the shortest femora have relatively broader lower extremities than the longest bones."

DEMOGRAPHY. VITAL STATISTICS

A LIFE TABLE FOR THE CITY OF NEW HAVEN. By Dublin (Louis J.)—*Am. J. Pub. Health*, 1918, VIII, 580-581.

The table is presented "for its own value as a measure of the vitality of the people of New Haven, and second, as an example to be fol-

lowed by health officers and others interested in public health work in American states and cities." It is based upon the population of New Haven in June 30, 1910, and upon the deaths of the three years 1909, 1910 and 1911.

The mortality in the first year of life was 113 per 1,000 births. It was lowest at 12, when less than two deaths occurred among every 1,000 living of that age. After 12, it increases regularly with each year of life. The expectation of life at birth for New Haven is 49.37 years; it reaches its maximum in the third year of life, when it is 55.22 years.

CENSUS OF THE VIRGIN ISLANDS OF THE UNITED STATES. U. S. Bureau of the Census Publ., 8°, Washington, 1917, 174 pp.

The total population of the Virgin Islands on November 1, 1917, was 26,051. For a long period there has been a steady decrease in numbers due to excess of deaths over births, and to excess of emigration over immigration. Between 1896 and 1916 there was but one year in which the loss through mortality was not greater than the gain through childbirth. The causes of this are social and economic. More than half of the poorer women are engaged as field laborers or in other hard occupations. And due to peculiar local conditions over two-thirds of the children are born out of wedlock.

By color or race the population is classed into white, negro, mixed (white-negro), and "all other." The whites numbered in 1917, 7.4 per cent; the "negroes" 74.9 per cent; the "mixed" 17.5 per cent, and the "all others" 0.2 per cent. The records on the negro and mixed bloods can not, however, be regarded as satisfactory, a good many of the latter having doubtless been counted among the former.

PRE-WAR STATISTICS OF POLAND AND LITHUANIA. By Drage (Geoffey)—*J. Roy. Statist. Soc.*, 1918, LXXXI, 229-321, 5 maps.

A somewhat biased paper on the side of the Poles, but giving data otherwise difficult to obtain, and two ethnographic maps which show the present distribution of the Poles. The total number of the Poles in the world amounted, in 1910, to 24,606,000, of which 12 million were in Russia, a little over 5 million in Austria-Hungary, and a little over 4 million in Germany. The total in Europe in 1914, at the outbreak of the war, was estimated at nearly 23,000,000.

In Russian Poland, in 1910, 74 per cent of the population was Polish, in Galicia 58.6 per cent, in German Poland 61.5 per cent, in West Prussia 35.5 per cent (rising in the neighborhood of Dantzig to 73 per cent).

EUGENICS

RECENT STATE LEGISLATION FOR PHYSICAL EDUCATION [in the United States]. By Storey (Thomas A.) & Willard S. Small—Bull. 40, U. S. Bureau of Education, Wash., 1919, 8vo, 35 pp.

Physical training or "education," if scientifically carried out on the youth of the country, may safely be expected to prove of great value

in favoring a better if not the optimum physical and physiological development, thus improving the ground for the future generation. That the appreciation of the importance of such training is spreading in this country is shown by the facts brought to public attention in the pamphlet under consideration. From this it appears that since June, 1915, eight states have enacted physical educational laws. They are Illinois, New York, New Jersey, Nevada, Rhode Island, California, Maryland and Delaware; while in a series of other states similar legislation is pending.

In most instances the initial impulse to these laws was interest in military preparedness, but the legislators soon saw the great value of such a step for enhancing the general fitness of the growing up youth of both sexes. This has been best expressed by the law of California, which defines the object of the law as follows:

"The aims and purposes of the courses of physical education established under the provisions of this act shall be as follows: (1) To develop organic vigor, provide neuro-muscular training, promote bodily and mental poise, correct postural defects, secure the more advanced forms of coördination, strength and endurance, and to promote such desirable moral and social qualities, as appreciation of the values of coöperation, self-subordination, and obedience to authority, and higher ideals, courage and wholesome interest in truly recreational activities; (2) To promote a hygienic school and home life, secure scientific sanitation of school buildings, playgrounds, and athletic fields, and the equipment thereof."

The objects, processes and accessories of physical education are thus summarized by the authors:

"Obviously the object of a State law for physical education is to secure the development of the potential physical capacity of the boys and girls of the State; to make them physically, morally, and socially fit for the duties of citizenship and the joy of wholesome living. Quite as obviously, no system of education, however broadly conceived, can do this single-handed. Education is but one of the social agencies involved in the successful upbringing of youth. Good housing, adequate food, and sane regulation of juvenile labor are equally necessary. Without these coöperative conditions, any system of physical education can be only partially successful in its appointed task of developing the physical capacity of the youth of the State; but an adequate and effective system of physical education will surely stimulate the development of these other agencies in a State.

"1. *Processes.*

"(a) Sufficient physical activity of the right character to insure development of strength, endurance, agility, and trained control of the muscular powers; and the moral and social qualities of courage self-control, selfsubordination, coöperation, and initiative.

"(b) Training into health habits and instruction in health knowledge in order that the individual may know how to take care of his 'animal machine' and may reverence it as a servant for high purposes.

"2. *Accessories.*

"(a) Physical examination—the charting, as it were, of each individual's physical character—repeated at sufficiently frequent intervals to secure a record of growth and physical status.

"(b) Provision for correction of deficient bodily conditions that impair health and development.

"(c) Adequate space and equipment for exercise appropriate to varying physical and mental status of children and youth.

"(d) Sanitary school environment, including buildings, grounds and equipment.

"(e) Organization and management of the daily school program and methods of instruction in the interest of health and vigor."

THE NEED FOR WIDESPREAD EUGENIC REFORM DURING RECONSTRUCTION. By Darwin (Leonard)—*The Eug. Rev.*, 1918, X, 145-162.

A renewed and well sustained plea by the author against indiscriminate and for selective human breeding—the greatest and most difficult tasks of eugenics. In working towards this end, the author suggests that—"If reliance were to be placed on the selection of individuals for exceptional treatment, attention should not only be paid to the individual merits of both the parties, but great weight should be attached to the merits of near relatives; for in that way the probable value of each additional offspring would be greatly increased, although it is true that the numbers selected might be greatly decreased. . . . Great attention should be paid to increasing the fertility of the large class of decidedly superior citizens, whilst any decrease in the fertility of the equally large class of decidedly inferior citizens would be equally beneficial to posterity as regards racial effects. To decrease the fertility of this large somewhat inferior class would be difficult; but we do thus see what great racial damage may be done by the indiscriminate promotion of parenthood. Lastly, it is to be noted that these two methods of seeking racial progress can be simultaneously adopted."

ABNORMAL CLASSES. MORTALITY. RACIAL PATHOLOGY. TERATOLOGY

STUDIES IN PALEOPATHOLOGY. By Moodie (Roy L.)—*Surg. Gynec. & Obst.*, Nov., 1918, 498-510.

Dr. Moodie, whom we already thank for a number of contributions to pathology among ancient forms of animals, approaches in the present publication the subject of disease in earlier forms and races of man. The article which is illustrated by forty-five text figures is, it is hoped, of only a preliminary nature. It ends with the following generalizations:

"The remains of fossil man and extinct animals show evidences of disease which are comparable to recent lesions. Indications of disease are rare compared with the abundance of remains of ancient races. This may indicate that disease has not been so prevalent in the past as at present, although it must be remembered that the evidence is all skeletal. Some of the lesions seen on fossil and sub-fossil remains

are: osteoma, hamangioma, fractures, callus, osteoperiostitis, necrosis, caries, alveolar pyorrhœa, hyperostoses, osteomalacia, spondylitis deformans. These and many other interesting lesions show us that disease is no new thing, but has been manifest in a diversity of forms for many millions of years."

A CENSUS OF THE MENTALLY DEFECTIVE IN N. Y. According to the *Eugenic News*—(1918, III, No. 9, 72), "the division of Mental Defect and Delinquency of the New York State Board of Charities has prepared a 5 × 8 inch card for recording the name, the individual record, and analysis of traits, as well as family connections of the mental defectives of New York. The card is so arranged that the entries can be made by checking or punching. It is printed on blue paper for females and on white paper for males. The idea is to prepare a condensed and permanent record of the state's mentally defective residents. If this census can be kept up to date, and the data called for by the card fairly accurately obtained, such a census will be of immense value to the state not only in handling the present problem of mental defect, but in putting into effect any scheme which it may later develop for preventing the reproduction of degenerate stock."

THE STATE AND PRENATAL HYGIENE. By McConnell (Edward)—*Brit. Med. J.*, 1918, 365-366.

If infant mortality is to be reduced, ante-natal care of the mother and child is quite as important as the post-natal, and implies inquiry into conditions which have little similarity with those properly belonging to the latter period. The author is of the opinion that it is "the distinct duty of the State to give earnest heed to the whole position of maternity, both pre-natal and post-natal. . . . The State might greatly help in this direction by appointing a commission to inquire into the whole question of ante-natal pathology."

INFANT MORTALITY [in Waterbury, Conn.]. By Hunter (Estelle B.)—U. S. Children's Bureau, Publ. No. 39, 8vo, Washington, 1918, 157 pp.

This is an elaborate report on the causes of the high infant mortality in one of the industrial cities of New England peopled largely by foreigners. It gives the "results of a field study in Waterbury, Conn., based on births in one year." The inquiry covered all the factors that play an important rôle in child morbidity, and the conclusions are in part summarized as follows:

Waterbury's infant mortality rate of 122.7 is largely the result of deaths from preventable causes. Practically all the deaths from gastric and intestinal diseases, a large proportion of the deaths peculiar to early infancy, and many of the deaths from respiratory and epidemic diseases can be prevented. The work of prevention should begin with complete birth registration. Stillbirths and the large number of deaths in the early weeks of life suggest the need for complete prenatal care.

On the whole, "infant deaths in Waterbury are largely preventable, a fact which should encourage an immediate campaign to reduce the infant mortality rate to a minimum."

MORTALITY AMONG WOMEN FROM CAUSES INCIDENTAL TO CHILDBEARING. By Dublin (Louis I.)—*Am. J. Obst. and Dis. Wom. and Child.*, 1918, LXXVIII, No. 1; repr. 8vo, 18 pp.

"A study of the mortality of women from the causes and conditions incidental to childbearing is of singular interest and importance at the present time in view of the nation-wide campaign for the conservation of civilian life during war time. Deaths of women from these causes affect the community deeply because they are for the most part preventable, and because they occur at periods of life when each death involves serious social loss. The amount of such loss is very considerable. Between the ages of fifteen and forty-four years, the diseases and conditions incidental to childbearing account for more deaths of women than does any other disease or class of diseases except tuberculosis. An examination of the available facts on maternal mortality should, therefore, assist materially in directing the plans which may be developed to control these causes of preventable death, distress and family disintegration.

"It is no light matter that with the present development of sanitary science and of preventive medicine there should still be one fatal termination in every 100 to 200 cases of pregnancy and childbirth. Yet this is the situation in a number of large centers of population for which adequate data are available. . . . These facts explain the recent efforts for the care of women in pregnancy. Prenatal work is fast becoming an integral part of the routine of preventive work of the departments of health of many American cities. In some communities, like Boston and New York, private agencies, coöperating with the visiting nurse associations, have specialized in the nursing of women throughout the period of pregnancy, confinement and after-care."

The best results have been obtained among women carrying life insurance. Large companies, such as the Metropolitan, "consider now the care of women after childbirth a major function of the service," and very encouraging results have already been obtained.

COLOR BLINDNESS [in the United States]: *Its relation to other ocular conditions, and the bearing on public health of tests for color sense acuity.* By Collins (George L.)—U. S. Pub. Health Serv. Bull. No. 92, Wash., 1918, 29 pp.

"In every day life among healthy individuals in America, color blindness (excluding the pentachromic) occurs in about 8.6 per cent of men and 2.2 per cent of women. Color blindness of a degree dangerous in occupations requiring recognition of colored signal lights, occurs in about 3.1 per cent of men and in about 0.7 per cent of women."

THE WAR AND VENEREAL DISEASES AMONG NEGROES. By Spingarn (Capt. Arthur B.)—*Soc. Hyg.*, 1918, IV, No. 3, 333-346.

"In the health problem of the negro, venereal disease looms large. This is particularly true in its relation to the war. Venereal disease is the greatest single factor in the non-effective rate of the Army, but the incidence of venereal disease is greater among negro troops than among white and the proportion of these diseases to all others is so marked that in one camp, for example, more than 90 per cent of the colored non-effectives were venereal."

As to negro population in general, exact data are wanting, but it can safely be said that "the incidence of venereal disease is higher among the great mass of colored people than among the majority of whites."

The author devotes his attention to remedial measures for these conditions, and points to their danger to the whites of this country. Their baneful effect on the negro progeny in the United States through heredity should also receive attention.

GERMANY'S ETHNIC PATHOLOGY. Edit., *Med. Times*, N. Y., 1918, XLVI, 215.

Based on some fallacies from Madison Grant's "Passing of the Great Race," evidently accepted as facts. No contribution to the subject expressed in the title.

This is merely another sad illustration of how really mischievous inaccurate and biased books of this nature may prove among people not directly and reliably acquainted with Anthropology. Few dilettante products of recent times have caused more popular confusion than the "Passing of the Great Race."

AUTOPSIES ON CHINESE.—Almost unknown to the outside world, China is progressing in more than one important direction. A particularly interesting notice is found in the 1916-17 Annual Report of the Peking Union Medical College (8vo, Shanghai, 1918), established under American auspices. The pathologist of the college states that during the year covered by the report, the number of autopsies was six times as great as during the previous year, that weights and measurements of the principal organs were made in the case of each autopsy, and that in several cases the brains were removed and preserved for future study.

RACIAL PATHOLOGY: CHINA.—The 1916-17 Report of the Peking Union Medical College (8vo, Shanghai, 1918), brings also interesting though necessarily restricted data on Chinese morbidity, which offer some ground for racial comparison. The conditions observed relate to 2,660 cases, of which 860 were medical treated in the Hospital, 1,130 medical treated in the Dispensary, and 670 surgical. They were classified as follows:

Medical, Hospital	Per Cent.	Medical, Dispensary	Per Cent.	Surgical (for Two Years)	Per Cent.
Intestinal parasites...	18.7	Skin diseases.....	24.6	Tuberculosis.....	16.1
Tuberculosis.....	11.1	Syphilis.....	12.0	Fistula in ano.....	14.6
Infectious diseases except tuberculosis and dysentery.....	7.3	Digestive.....	10.7	Cellulitis.....	8.5
Opium poisoning.....	6.9	Tuberculosis (lungs).....	10.4	Injuries.....	8.8
Syphilis.....	6.5	Other respiratory....	8.6	Malignant tumors..	4.9
Respiratory diseases except tuberculosis..	5.1	Intestinal parasites..	9.0	Abscesses.....	4.5
Urinary apparatus....	4.0	Nervous.....	8.9	Hemorrhoids.....	4.3
Diarrhœa, colitis, dysentery.....	4.0	Diarrhœa, dysentery..	5.4	Benign tumors.....	2.9
Circulatory.....	3.8	Joints.....	4.4	Carbuncles.....	2.5
Digestive.....	3.8	Circulatory.....	3.3	Herniæ.....	2.5
Blood diseases.....	1.7	Urinary.....	2.6	Miscellaneous.....	30.4
Miscellaneous.....	3.9	Blood.....	0.7		

SCHÄDEL EINES AN GUNDU ERKRANKTEN MELANESIERS. By Schlaginhaufen (O.)—*Mitteil. Geog.-Ethnog. Ges. Zürich*, 1917-18; repr., 8vo, 19 pp., 2 pl.

The author describes an adult male skull from Feni island, one of the New Ireland group, with pathological lesions that bear some resemblance to syphilitic, but which he believes to be those of "gundu," an African endemic disease of apparently parasitic origin, which is now also known to extend to Melanesia. Among 800 skulls of Melanesians from various localities this was the only specimen showing the pathological condition.

A useful bibliography of the "gundu" disease is appended.

ACERCA DEL INFANTILISMO. By Valdizan (Hermilio)—*Revista de Psychiatria* (Lima, Peru), 1918, I, 25-35.

Report of five cases of more or less marked infantilism, of which four physical, in males of unsound white or mestizo parentage, are due in the opinion of the author to inherited derangement of glands of internal secretion. No measurements.

AN UNUSUAL RIGHT LUNG. By Marshall (Matthew)—*Anat. Rec.*, 1918, XV, 101-102.

A rudimentary middle lobe so hidden in the interlobular fissure as to make the lung appear two-lobed from a simple surface inspection; and an unusual distribution of the second lateral bronchus.

UN CASO DE AUSENCIA CONGENITA BILATERAL Y COMPLETA DEL RADIO Y DE TODOS LOS HUESOS DEL CARPO. By Lestache (Garrido)—*Pediatrica españ.*, Madrid, 1918, VII, 91-94.

A boy of nine days, born at term and in normal way, presents a deformity of both forearms and wrists, which by the help of X-rays is found to be due to a complete bilateral absence of the radius and of all the carpal bones. The hands are normal. The family history shows nothing unusual. During the seventh month of gestation the

mother suffered some abdominal injury, which however could hardly have had any influence on the production of the anomaly. While cases of a congenital absence of the radii are well known, the author could find no record of another instance where both the radii and all the carpal bones were wanting.

ANTHROPOLOGICAL PROBLEMS PECULIAR TO THE UNITED STATES

A CENTURY OF NEGRO MIGRATION [in the U. S.]. By Woodson (Carter G.)—12mo, Washington, D. C., 1918, 221 pp.

The motive for this instructive and sympathetically written little volume has been the accelerated exodus of the negro from the South during the war. Its nine chapters deal respectively with: Finding a Place of Refuge; A Transplantation to the North; Fighting it out on Free Soil; Colonization as a Remedy for Migration; The Successful Migrant; Confusing Movements; The Exodus to the West; The Migration of the Talented Tenth; The Exodus during the World War. To which is added a large bibliography relating directly or indirectly to the subject, and a map showing the per cent of negroes in total population, by states, in 1910; a diagram showing the negro population of northern and western cities in 1900 and 1910; and maps showing countries in southern states in which negroes formed 50 per cent of the total population.

The migration movement has been greatly accelerated by the conditions connected with the war. "Within the last two years there has been a steady stream of negroes into the north, in such large numbers as to overshadow in its results all other movements of its kind in the United States. These negroes have come largely from Alabama, Tennessee, Florida, Georgia, Virginia, North Carolina, Kentucky, South Carolina, Arkansas and Mississippi. The given causes of this migration are numerous and complicated."

The causes as well as the effects of the negroes leaving the South, both before and during the war, are mainly economical and social, and the details relating to the subject are quite interesting. But the author has little to suggest as to how these changes will affect the negro multiplication, constitution, and his further mixture with the white race.

THE AMERICAN INDIAN

FORTY-NINTH ANNUAL REPORT OF THE BOARD OF INDIAN COMMISSIONERS TO THE SECRETARY OF THE INTERIOR, for the Fiscal Year Ended June 30, 1918. Washington, Government Printing Office, 1918.

About eleven pages of this pamphlet contain the report proper; the balance consists of appendices dealing with the Blackfeet and "Rocky Boy's band" of Indians, in Montana, the Mississippi Choctaw, the Seminole of Oklahoma, the Crow, Papago, Pima, Indians of the Mesquero reservation, N. M., those of the Greenville and Round Valley jurisdictions, California, and of the Cushman and Tulalip agencies,

Washington, and the Iroquois of St. Regis, N. Y., besides more general reports on the possible use of Indians as forest rangers and as cotton pickers in Arizona, cattle raising among the Menominee, a recently conducted "health drive" in Oklahoma, and a "report on the moral conditions on reservations." Of particular interest is the statement of conditions brought about by the war (pp. 11-13); since it was written, the conclusion of the latter has no doubt alleviated many of the ill effects mentioned, particularly the shortage of doctors. Better pay is recommended for physicians employed in the Indian service and greater independence for the medical corps "in its functions and authority." In spite of much good work accomplished it is evident that far more must be done to stay the ravages of certain diseases, particularly tuberculosis and trachoma. A depressing picture is drawn about moral conditions in and about many reservations, but it would seem that rather too much reliance is placed on police powers as a remedy. Is the fact that the best reports come from those Indians with which the Government has least to do to be interpreted as an indictment of the reservation system, or have these Indians been successfully carried up through the reservation period? The former is suggested by Commissioner Smiley (pages 67 and 71), and his opinions coincide very closely with views entertained by a great many other friends of the Indians.—JOHN R. SWANTON.

A GEOGRAPHICAL STUDY OF THE EARLY HISTORY OF THE ALGONQUIAN INDIANS. By Birket-Smith (Kay)—*Internat. Arch. Ethnog.*, 1918, XXIV, 174-222, 2 maps.

On ethnological grounds the author places the original home of the Algonquian stock in the far Northwest. Regrettably the paper contains many assumptions which weaken it. Of the two maps the first gives the probable distribution of the Algonquians in the first half of the 16th century, the second dealing with their probable migrations.

AN EARLY ACCOUNT OF THE CHOCTAW INDIANS. By Swanton (John R.)—*Memoirs of the American Anthropological Association*, Vol. V, No. 2, April-June, 1918.

This is part of a French Louisiana relation of uncertain authorship. It is of value as being the longest known account of the Choctaw Indians left by an early writer. At the time when it was written this tribe lived in what is now southeastern Mississippi in three cantons of 6, 4, and 35 villages respectively and counted about 4,000 warriors. It is interesting to note that, in addition to the regular villages just mentioned and a number of smaller villages of the same character, there lived in the same country "wandering savages" who planted no fields, but lived solely by following the herds of bison.

MUTILATIONS AND DECORATIONS OF TEETH AMONG THE INDIANS OF NORTH, CENTRAL AND SOUTH AMERICA. By Van Rippen (Bene)—*J. All. Dent. Socs.*, Sept., 1918, 219-242, 8 pl., 3 maps, 1 fig.

A comprehensive review of the subject, with a number of original illustrations; of indirect nevertheless real interest to physical anthropology, particularly so far as knocking out of teeth is concerned. The distribution of the various practises is shown in an effective manner.

WAR ANTHROPOLOGY

LA PENINSULE BALKANIQUE. *Geographie Humaine*. By Cvijić (Jovan)—8vo, Paris, 1918, VIII, 530, 9 maps, 28 fig.

By far the most comprehensive and valuable recent work on the Balkans. It is not a contribution to the propaganda of a particular ethnic group, but a scientific account embodying the results of a lifelong work of Professor Cvijić on his own as well as the other peoples of the Balkan peninsula.

It is impossible to point out in a necessarily brief abstract the author's conclusions; but an idea of the field covered may be had from the more important parts of the table of contents, which include the following: Eurasiatic character of the population of the peninsula, and ancient civilization; penetrations; separations and isolation; environmental regions and their influence on the population; principal historical facts; the great invasions and ethnic changes; internal movements of population; present ethnic distribution; mental types of the Slav population.

The maps include two that are of particular value, namely that on the ethnography and that—probably unique—on the mental types of the Balkans.

It is to be regretted that a chapter on the physical anthropology of this highly interesting region could not have been included; but perhaps the data extant were not regarded as sufficient, or were not now available.

A good English edition of this whole work would be very useful.

CENTRAL HUNGARY: MAGYARS AND GERMANS. By Wallis (B. C.)—*Geogr. Rev.*, Nov., 1918, 421-435, 1 maps

This is the last of four good articles on the peoples and conditions of Hungary. The earlier contributions were entitled "The Rumanians in Hungary," "The Slavs of Northern Hungary," and "The Slavs of Southern Hungary"; and they appeared respectively in the August, September, and October numbers of the *Geographic Review*. They present a first-hand, untarnished view of the racial, political and other conditions in a land on which such information is particularly scarce and desirable. The final paper of the series ends with an outline of the deleterious effects of the war on Hungary's population.

A PHYSICAL CENSUS [IN ENGLAND] AND ITS LESSON. Edit., *Brit. Med. J.*, 1918, 348-9.

The results of the physical examinations in England of drafted men for the first eight months of 1918, show that "between January 1 and

August 31, 1918, the number of medical examinations conducted by National Service Medical Boards in Great Britain amounted to 2,080,709. Of the two million men examined not more than 36 or 37 per cent were placed in Grade I—that is, approximately only one in every three had attained the normal standard of health and strength and was capable of enduring physical exertion suitable to his age; the remainder—more than a million and a quarter—did not reach this standard. The suggestion has been made that the low proportion of fit men among those examined during this period was due to the fact that only the leavings of the population were under review. Analysis of the records available, however, shows that this is not the case, and that as a fact the men examined constituted a fair sample of the male population between the ages of 18 and 43 and a smaller proportion of the more fit between 43 and 51. We are told further that the experience of the boards medically examining women for national work corresponds broadly to that of the National Service Medical Boards examining men. Such evidence points only too clearly to a deplorably low state of national health.

“While it has not yet been possible to work out the details of this great mass of medical examinations, the preliminary results indicate that preventable disease is responsible for the bulk of the physical disabilities, and demonstrate the ravages which industrial life has made upon our real national capital—the health and vigor of the population. Too little food, too long hours of work, too little sleep, too little fresh air, too little play, too little comfort in the home, are evidently the chief factors concerned in producing this mass of physical inefficiency with all its concomitant human misery and direct loss to the country. To take effective measures on the broadest lines to remedy this condition of things is a most urgent duty. Although real improvement can hardly be expected for one or two generations, the foundations of a better national physique can be laid at once.”

FINLAND AND THE FINNS. By Reade (Arthur)—8vo, N. Y., 1917, 336 pp.

A general description of Finland and the Finns of the last two decades. A few remarks on the origin and racial identity of the people are found on pp. 9–10. The Finns “belong to the Finnish-Ugrian stock. They are related to the Esthonians and Livs, and more distantly to the Finnish tribes on the Volga and in the Urals. They are supposed to have come to Finland in different detachments about the end of the seventh century, from the region about the Volga. Two main subdivisions are usually distinguished among them, namely, the Karelians and the Tavasts, inhabiting the east and west of Finland respectively. The Tavasts are the tougher race, the Karelians the more sociable and artistic.”

THE SEX RATIO IN EMIGRATION [in England]. By Stock (C. S.)—*The Eug. Rev.*, 1918, X, 183–166.

Author points out that the questions of excess of females over males in England, and the capacity of the mother country of sending a valuable surplus to the Dominions, are not as simple as usually assumed. The real excess of unmarried females in best years for motherhood and of the most desirable classes for emigration, is relatively small. Moreover, while the Government has certain powers in regard to emigration, these do not enable any effective control of it. There is therefore not much hope that the needs of the colonies in this respect can adequately be met by the mother country.

THE BIOLOGY OF WAR. By Nicolai (G. F.): transl. from German by Constance A. Grande and Julian Grande. 12mo, N. Y., 1918, I-XXX, 1-553.

In many respects a remarkable, though not wholly unbiased book, written by a prominent German medical man who on biological, historical and intellectual basis was opposed to the war. The German edition was published in Switzerland, and brought the author an imprisonment in Germany.

It would be difficult to give a brief abstract of the work, which represents much intensive thought as well as erudition, but some idea of it may be gained from the following note by the translators: "One of the author's main contentions is that the dusk of the War Gods has come. An animal, he says, just before it becomes extinct, usually grows monstrously unwieldy and clumsy. War has done likewise: it has grown beyond all bounds. Again, he contends that there is no biological justification for war now, and in particular none whatever for the favorite German argument that without war nations become degenerate and effeminate. Finally, he asserts that war is never to be regarded as a necessary and inevitable part of nature, something which, like an earthquake, is wholly beyond human control, and something to which we *must* submit."

The most interesting chapters from anthropological standpoint are: War Instincts; War and the Struggle for Life; Selection by Means of War; The Chosen People; The Legitimate Individualism of Nations; and The World as an Organism.

A noteworthy production, much above the average. If it leaves any regrets they are that it could not have been more exclusively historical and biological.

THE EUGENIC AND SOCIAL INFLUENCE OF THE WAR. By Lindsay (J. A.)—*The Eug. Rev.*, 1918, X, 133-144.

"Two theories are possible regarding the eugenic and social influence of war in general. The first theory maintains that war is, in the main, profoundly dysgenic and anti-social, wasteful of the best life of nations, destructive of capital and of the fruits of industry, a propagator of disease, hurtful to the stock, a well-spring of international hatred and alienation. The alternative theory is the view that war is a tonic, though admittedly a severe tonic, to the nations; that

it promotes the virile virtues—courage, endurance, self-sacrifice; that it imposes a wholesome discipline; that it is a great school of patriotism, efficiency, and national solidarity; that prolonged peace leads to softness of manners and racial decadence.”

The questions at issue are, however, extremely complex. The influence of war cannot be compressed into a single, simple and unambiguous formula. It varies according to the duration and results of the war, and many other conditions.

The author considers especially the questions of: What will be the wastage of man-power in this war, and what will be the effect of that wastage; what are and what will be the effects of the war on marriage, birth and death rates, on the numerical relations of sexes, on infant mortality, on health and disease in general, on crime and suicide; and what will be the following and doubtless far-reaching social changes. After presenting an array of interesting data and observations he concludes, with special reference to England:

“When we come to count up the gains and losses of the war, there can be but little doubt as to which side the balance will incline. The nation will have lost heavily in man power, in brain power, in capital, and in industrial resources. But there will be some not inconsiderable compensations. The nation will have been through the fire, and will, we may hope, emerge from this great ordeal purged of some of its defects. Luxury will diminish, thrift will increase. Food production at home will have received a great stimulus. Education will be on sounder lines. We shall be more teachable, less self-satisfied, readier to profit by example. The national spirit will be newly attuned to high issues.” A new epoch will have been born. War like the other great scourges of humanity—famine, tempest and pestilence—is not wholly mischievous. When the storm is over, and the sky has cleared again, we may be able to say, in the words of our great poet: ‘There is some soul of goodness in things evil. Would men observingly distil it out.’”

WAR AND POPULATION.—Figures from the Registrar-General’s Report:

1. Loss in Births:

United Kingdom.....	500,000	potential lives
Germany.....	2,600,000	“ “
Hungary.....	1,000,000	“ “

2. A total of 7,000 potential lives were lost every day to the belligerent countries.

3. The rise in the proportion of male over female births has been marked, *i. e.*, 1,046 or eight above the average of the 40 years before the War.

4. The increase in mortality among the old in England and Wales has been 23 per cent among males, and 22 per cent among females, but in Scotland 13 per cent and 6.4 per cent, and in Ireland only 5 per cent and 4.4 per cent respectively.

5. The stoppage of emigration has kept at least 1,000,000 in the United Kingdom who, under normal conditions, would have left the country—a number which probably exceeds our losses in battle.

6. The War is certainly producing race suicide, but at a far more rapid rate in the Central Empires than the United Kingdom. In the latter, the population has actually increased, while in the former the total loss has been about 4,000,000.—*The Eug. Rev.*, Oct., 1918, X, 194.

METHODS

PEDAGOGIC ANTHROPOLOGY:—La fiche scolaire. Transformation en indications pédagogiques des données de l'Anthropologie sur la nature individuelle de l'enfant des deux sexes. By Godin (Paul)—*C. R. Acad. Sc. Paris*. 1918, T. 167, pp. 381-383.

Dr. Godin, the well-known French authority on child study, outlines in this communication an interesting and promising method for periodic recording of the physical, physiological and mental status of the student. The adoption of a method of this nature would go far in advancing the present empirical methods of education towards a system of scientific accuracy.

PERSONAL IDENTIFICATION—METHODS FOR THE IDENTIFICATION OF INDIVIDUALS, LIVING OR DEAD. By Wilder (Harris Hawthorne), Ph.D., Professor of Zoölogy in Smith College, and Bert Wentworth, former Police Commissioner of Dover, N. H. Boston, Richard Badger (The Gorham Press), 1918, 8vo, 374 pp., with numerous illustrations.

A good deal of misinformation and misunderstanding exist as regards what has been accomplished in this interesting field of research. By their manual the authors have achieved the double purpose of clearing the air of misconceptions and of blazing the way for a wider application in the future of the principles governing personal identification. In fact they aim at nothing short of a universal system through the establishment of a National Identification Bureau by each civilized nation. Personal identification means more than keeping tabs on criminals; it means even more than finger-printing although this will continue to be a most important factor.

The volume is divided into two parts, the first dealing with methods which furnish partial identification such as measurements, natural and artificial markings, habits, gait, handwriting, etc., the second with methods which furnish absolute identification based on a study of the friction skin of the palms, soles, and digits. The credit for the practical application of the friction ridges for identification purposes is rightly given to a group of Englishmen—Dr. Henry Faulds, Sir William Herschel, and Sir Francis Galton. It is also pointed out that Alphonse Bertillon, although in 1893 not a believer in the possibility of the practical use of finger prints, in 1895 had added to his descriptive cards a blank for finger prints, thus being one of the first to realize their importance. On June 16, 1897, the reviewer visited Ber-

tillon's laboratory in the *Palais de Justice* and submitted to the examination employed at that time. So far as the finger prints are concerned only four were taken, that of the little finger being omitted.

While in no way minimizing the importance of digital prints, the authors especially recommend palm and sole prints. In the case of infants, the sole prints are the easiest of all to take, as well as the most satisfactory. The sole print of the infant would thus logically become the basis of any universal system of identification. The satisfactory volume ends appropriately with a chapter on the present use of friction-ridge identification and its future possibilities.

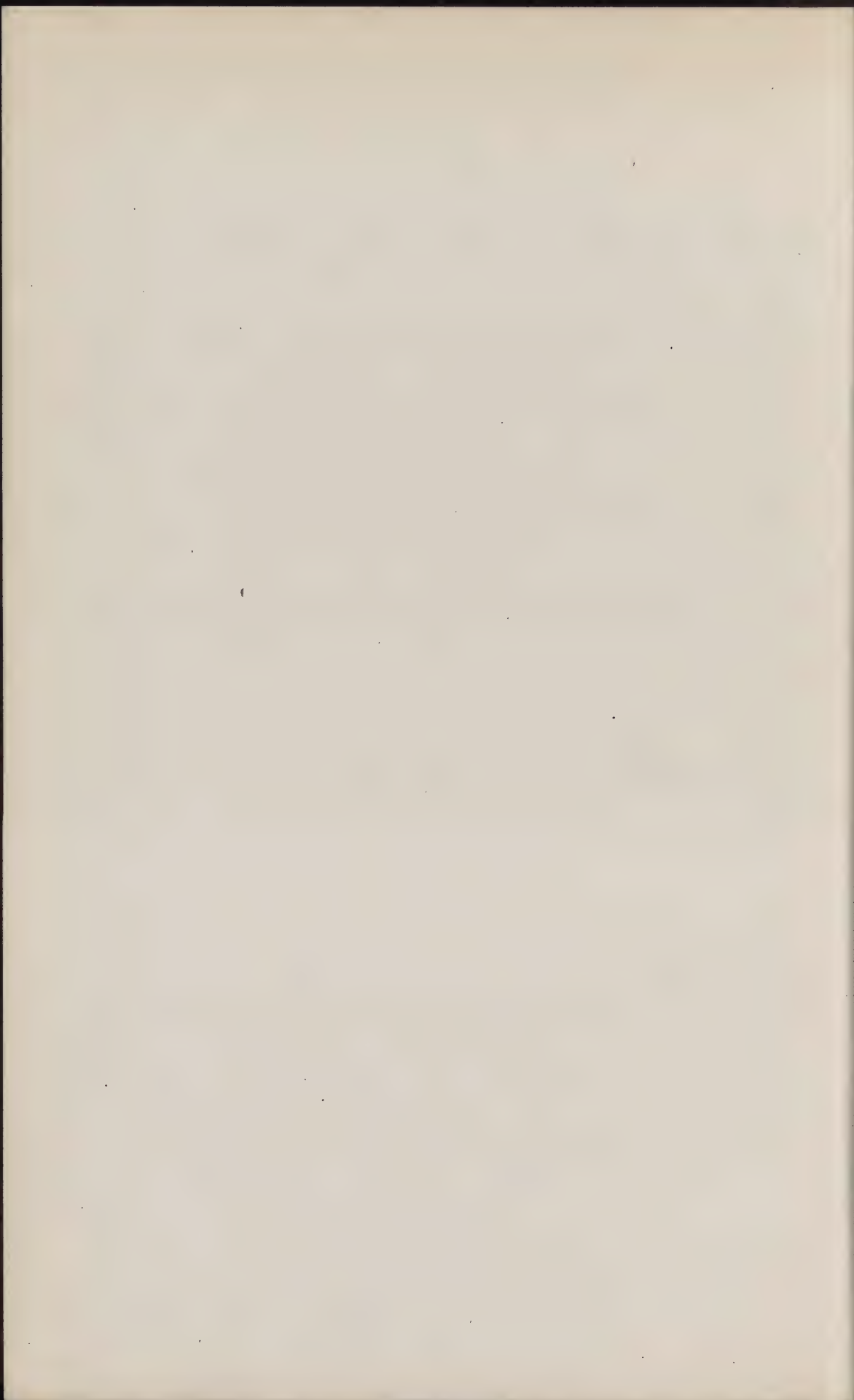
GEORGE GRANT MACCURDY

PERITAJE SOMÁTICO EN CASOS DE FILIACIÓN NATURAL. By Lehmann Nitsche (R.)—*Anal. Facult. Derecho y Cienc. Soc.*, Univ. Nac. de Cordoba (Arg.), 1917, III; sep. 8vo, 22 p.p

Due to certain laws and social habits in Argentina, law-suits in behalf of "natural" sons or daughters for recognition of parentage and especially for participation in the division of property left by the claimed father, are of frequent occurrence, and afford opportunities for valuable services by physical anthropology. The author outlines a method of somatological examination in such cases. The whole shows an interesting and effective application of anthropological methods to law and legal medicine.

THE PREPARATION OF DRY SPECIMENS FOR THE WAR OFFICE COLLECTION. By Richardson (G.)—*Edinb. Med. J.*, 1917, N. S., XIX, 239-241.

Prepares fresh osteological specimens in two days by immersion (after initial cleaning) into 4 per cent solution of caustic soda, with subsequent boiling for a quarter of an hour in a solution of chloride of lime.



NOTES

NATIONAL RESEARCH COUNCIL

The National Research Council, organized during the war, bids fair to become perpetuated for the purpose not in any way of controlling and thereby hampering scientific activities in this country, as sometimes feared, but of assisting scientific research and cooperation in all branches, Anthropology included; and of stimulating similar steps in foreign countries.—*Ed.*

EXECUTIVE ORDER ISSUED BY THE PRESIDENT OF THE UNITED STATES, MAY 11, 1918

The National Research Council was organized in 1916 at the request of the President by the National Academy of Sciences, under its Congressional charter, as a measure of national preparedness. The work accomplished by the Council in organizing research and in securing co-operation of military and civilian agencies in the solution of military problems demonstrates its capacity for larger service. The National Academy of Sciences is therefore requested to perpetuate the National Research Council, the duties of which shall be as follows:

1. In general, to stimulate research in the mathematical, physical and biological sciences, and in the application of these sciences to engineering, agriculture, medicine and other useful arts, with the object of increasing knowledge, of strengthening the national defense, and of contributing in other ways to the public welfare.

2. To survey the larger possibilities of science, to formulate comprehensive projects of research, and to develop effective means of utilizing the scientific and technical resources of the country for dealing with these projects.

3. To promote co-operation in research, at home and abroad, in order to secure concentration of effort, minimize duplication, and stimulate progress; but in all co-operative undertakings to give encouragement to individual initiative as fundamentally important to the advancement of science.

4. To serve as a means of bringing American and foreign investigators into active co-operation with the scientific and technical services

of the War and Navy Departments and with those of the civil branches of the Government.

5. To direct the attention of scientific and technical investigators to the present importance of military and industrial problems in connection with the war, and to aid in the solution of these problems by organizing specific researches.

6. To gather and collate scientific and technical information at home and abroad, in co-operation with Governmental and other agencies and to render such information available to duly accredited persons.

Effective prosecution of the Council's work requires the cordial collaboration of the scientific and technical branches of the Government, both military and civil. To this end representatives of the Government, upon the nomination of the National Academy of Sciences, will be designated by the President as members of the Council, as heretofore, and the heads of the departments immediately concerned will continue to co-operate in every way that may be required.

(Signed) WOODROW WILSON

THE WHITE HOUSE,
May 11, 1918

ORGANIZATION OF THE NATIONAL RESEARCH COUNCIL

PREAMBLE

The National Academy of Sciences, under the authority conferred upon it by its charter enacted by Congress, and approved by President Lincoln on March 3, 1863, and pursuant to the request expressed in an Executive Order made by President Wilson on May 11, 1918, hereto appended, adopts the following permanent organization for the National Research Council, to replace the temporary organization under which it has operated heretofore.

ARTICLE I.—PURPOSE

It shall be the purpose of the National Research Council to promote research in the mathematical, physical, and biological sciences, and in the application of these sciences to engineering, agriculture, medicine, and other useful arts, with the object of increasing knowledge, of strengthening the national defense, and of contributing in other

ways to the public welfare, as expressed in the Executive Order of May 11, 1918.

ARTICLE II.—MEMBERSHIP

Section 1. The membership of the National Research Council shall be chosen with the view of rendering the Council an effective federation of the principal research agencies in the United States concerned with the fields of science and technology named in Article I.

Section 2. The Council shall consist of

1. Representatives of national scientific and technical societies;
2. Representatives of the Government, as provided in the Executive Order;
3. Representatives of other research organizations and other persons whose aid may advance the objects of the Council.

ARTICLE III.—DIVISIONS

Section 1. The Council shall be organized in Divisions of two classes:

- A. Divisions dealing with the more general relations and activities of the Council;
- B. Divisions dealing with related branches of science and technology.

Section 2. The initial constitution of the Divisions of the Council shall be as follows:

A. Divisions of General Relations:

- I. Government Division.
- II. Division of Foreign Relations.
- III. Division of States Relations.
- IV. Division of Educational Relations.
- V. Division of Industrial Relations.
- VI. Research Information Service.

B. Divisions of Science and Technology:

- VII. Division of Physical Sciences.
- VIII. Division of Engineering.
- IX. Division of Chemistry and Chemical Technology.
- X. Division of Geology and Geography.
- XI. Division of Medical Sciences.
- XII. Division of Biology and Agriculture.
- XIII. Division of Anthropology and Psychology.

Section 3. The number of divisions and the grouping of subjects in Article III, section 2, may be modified by the Executive Board of the National Research Council.

Section 4. The Divisions of General Relations shall be organized by the Executive Board of the National Research Council (Article IV, section 2).

Section 5. To secure the effective federation of the principal research agencies in the United States, provided for in Article II, a majority of the members of each of the Divisions of Science and Technology shall consist of representatives of scientific and technical societies, chosen as provided for in Article V, section 2. The other members of the Division shall be nominated by the Executive Committee of the Division, approved by the Executive Board of the National Research Council, and appointed in accordance with Article V, section 4.

Section 6. The Divisions of the Council, with the approval of the Executive Board, may establish sections and committees, any of which may include members chosen outside the membership of the Council.

ARTICLE IV.—ADMINISTRATION

Section 1. The affairs of each Division shall be administered by a Chairman, a Vice-Chairman, and an Executive Committee, of which the Chairman and the Vice-Chairman shall be ex-officio members; all of whom shall be elected annually by the Division and confirmed by the Executive Board.

Section 2. The affairs of the National Research Council shall be administered by an Executive Board, of which the officers of the Council, the President and Home Secretary of the National Academy of Sciences, the President of the American Association for the Advancement of Science, the Chairmen and Vice-Chairmen of the Divisions of Science and Technology, and the Chairmen of the Divisions of General Relations shall be ex-officio members. The Executive Board may elect additional members, not to exceed ten in number, who, if not already members of the National Research Council, shall be appointed thereto, in accordance with Article V, section 4.

Section 3. The officers of the National Research Council shall consist of a Chairman, one or more Vice-Chairmen, a Secretary, and a Treasurer, who shall also serve as officers of the Executive Board of the Council.

Section 4. The officers of the National Research Council, excepting the Treasurer, shall be elected annually by the Executive Board. The Treasurer of the National Academy of Sciences shall be ex-officio Treasurer of the National Research Council.

Section 5. The duties of the officers of the Council and of the Divisions shall be fixed by the Executive Board.

ARTICLE V.—NOMINATIONS AND APPOINTMENTS

Section 1. The Government bureaus, civil and military, to be represented in the Government Division, and the scientific and technical societies, to be represented in the Divisions of Science and Technology of the National Research Council, shall be determined by joint action of the Council of the National Academy of Sciences and the Executive Board of the National Research Council.

Section 2. Representatives of scientific and technical societies shall be nominated by the societies, at the request of the Executive Board, and appointed by the President of the National Academy of Sciences to membership in the Council and assigned to one of its Divisions.

Section 3. The representatives of the Government shall be nominated by the President of the National Academy of Sciences after conference with the Secretaries of the Departments concerned, and the names of those nominated shall be presented to the President of the United States for designation by him for service with the National Research Council.

Section 4. Other members of the Council shall be nominated by the Executive Committees of the Divisions, approved by the Executive Board, and appointed by the President of the National Academy of Sciences to membership and assigned to one of the Divisions.

Section 5. Prior to the first annual meeting of the Council following January 1, 1919, all Divisions shall be organized by appointment of their members in accordance with Article II and Article V, sections 1 to 4.

Section 6. As far as practicable one-third of the original representatives of each scientific and technical society and approximately one-third of the other original members of each of the Divisions of Science and Technology shall serve for a term of three years; one-third for a term of two years, and one-third for a term of one year, their respective terms to be determined by lot. Each year thereafter, as the terms of members expire, their successors shall be appointed for a period of three years.

Section 7. The Government representatives shall serve for periods of three years, unless they previously retire from the Government office which they represent, in which case their successors shall be appointed for the unexpired term.

Section 8. As far as practicable a similar rotation shall be observed in the appointment of the members of the Divisions of General Relations.

ARTICLE VI.—MEETINGS

Section 1. The Council shall hold one stated meeting, called the annual meeting, in April of each year, in the city of Washington, on a date to be fixed by the Executive Board. Other meetings of the Council shall be held on call of the Executive Board.

Section 2. The Executive Board and each of the Divisions shall hold an annual meeting, at which officers shall be elected, at the time and place of the annual meeting of the Council, unless otherwise determined by the Executive Board, and such other meetings as may be required for the transaction of business.

Section 3. Joint meetings of the Executive Board of the National Research Council and the Council of the National Academy of Sciences shall be held from time to time, to consider special requests from the Government, the selection of organizations to be represented in the National Research Council, and other matters which, in the judgment of the President of the National Academy, require the attention of both bodies.

ARTICLE VII.—PUBLICATIONS AND REPORTS

Section 1. An annual report on the work of the National Research Council shall be presented by the Chairman to the National Academy of Sciences, for submission to Congress in connection with the annual report of the President of the Academy.

Section 2. Other publications of the National Research Council may include papers, bulletins, reports, and memoirs, which may appear in the Proceedings or Memoirs of the National Academy of Sciences, in the publications of other societies, in scientific and technical journals, or in a separate series of the Research Council.

RESOLUTIONS ON THE RELATIONS OF ANTHROPOLOGY TO THE NATIONAL RESEARCH COUNCIL, ADOPTED BY SECTION H, AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

"At the Thursday, Dec. 26, meeting of Section H, Professor J. C. Merriam outlined the present plans of the National Research Council for continuation of its organization. The following resolution was presented at that time and formally adopted at the business meeting of the Section, Friday afternoon, Dec. 27: *Resolved,*

(a) That Section H heartily approves the plan of the National Research Council for bringing about closer cooperation of related branches of science favoring research.

(b) That, however, it is the opinion of Section H that good results in this direction can only be expected if perfect autonomy and freedom of each branch of science represented is safeguarded in the proposed Division (which is to include Anthropology and Psychology).

(c) And that it is further the opinion of the Anthropologists and Psychologists of Section H here assembled that the direction of each Division as proposed of the National Research Council should be vested, not in a single appointee, but in a board consisting of a representative of each branch of science embraced in the Division, and that these representatives shall be men whose selection is ratified by the principal associations and bodies of the respective branches of science."

EDWARD K. STRONG, JR.,

Sec'y Section H, A.A.A.S.

REPORT ON ANTHROPOLOGY AND ITS RELATIONS TO THE NATIONAL
RESEARCH COUNCIL, BY A COMMITTEE OF THE AMERICAN
ANTHROPOLOGICAL ASSOCIATION

PROFESSOR G. E. HALE,

President National Research Council,

Washington, D. C.

At the meeting of the American Anthropological Association held in Baltimore, December 27th, Professor J. C. Merriam, representing the National Research Council, made a formal statement of the plans of the Council in regard to the organization of science, and requested an expression of opinion on the part of the American Anthropological Association in regard to the position of anthropology in the work of the National Research Council.

In consequence of this request and the discussion following it, the undersigned committee was appointed for the purpose of giving to the National Research Council information in regard to the work actually done by American anthropologists. A statement has been added pointing out the causes for the slow development of certain branches of anthropology.

The committee submitted a number of questions to American anthropologists and attached to this are a number of replies to our circular letter.

The general tendency of the scientific work of American anthro-

pologists may briefly be summarized as follows: It is but natural that in a country like our own, which contains the remains of a considerable number of primitive people, the historical interest in the aborigines, combined with the ease of accessibility of the remainder of the ancient tribes, should bring it about that inquiries relating to their customs, languages, and physical types should dominate American anthropological research, and that theoretical work should be based very largely upon the results obtained from a study of American tribes. The methods which give the easiest results in regard to these problems are archaeological, ethnographical, and linguistic, and for this reason these three lines of inquiry have hitherto predominated in the research work of American anthropologists.

At the same time the necessity for a broader outlook is keenly felt. The Field Museum of Natural History has included in the scope of its work Eastern Asia, Malaysia and Melanesia. Harvard University has expanded its work over Africa. The University of Pennsylvania has undertaken research work in South America, the American Museum of Natural History and the United States National Museum, in Asia, and a few other attempts of similar kind for obtaining a wider basis for research in cultural history may be noted.

The field of work of American anthropologists is also in part determined by the character of the institutions that maintain anthropological work. The Bureau of American Ethnology which forms part of the Smithsonian Institution is by law restricted to work on the natives of America and the Hawaiian Islands. Most positions held by working anthropologists are museum positions, and consequently the scientific work is largely restricted to those aspects of anthropology that yield tangible specimens. University positions are on the whole of such a character that the funds necessary for the conduct of field work are not supplied by the universities, but if available at all, come from museums.

Anthropologists have felt for a long time that their work needs expansion, and many attempts have been made to free anthropological research from the restrictions dependent upon the association of anthropological work with museums on the one hand, and from those conditions that tend to give undue preponderance to work on American Indians on the other hand. Attempts have been made particularly to direct attention to African problems, which are of importance to us on account of our large negro population, and also to investigations on racial anthropology among the white and negro populations of the United States. Work of this kind needs financial support, but all

attempts have failed to interest the Government Institutions which command considerable funds; or private individuals, to support work of this kind. There is a peculiar hesitancy in regard to undertakings of this type, which will not be overcome until more work on a smaller scale has been done. Investigations of this type have been undertaken by American anthropologists and by educators, sociologists, and medical men with anthropological leanings. Recently, biologists have also directed their attention to this subject, but methods applied and results obtained up to this time are quite unsatisfactory. Work on human paleontology is also not vigorously pursued.

The difficulty of giving anthropological research an adequate position in the scheme of the National Research Council is largely based on the fact that the humanities find no place in the general scheme of work of the Research Council. While anthropology must necessarily be based on the one hand on biological science, on the other hand it is intimately associated with the humanities. It is impossible to treat even the biological problem of anthropology without a due regard to the cultural aspect of anthropology, because the forces which determine the development of human types are to a very large extent cultural forces.

The peculiar position of anthropology brings about close contact with a great many different sciences,—biology, geology, paleontology, geography, psychology, history, linguistics, and the whole range of humanities. Cooperation will be necessary according to the particular type of problems taken up, and anthropology will be best served by an entirely free association with different subjects, according to the need of each case.

It is the opinion of the undersigned committee that the appointment of a director of anthropological work, who would have a dominating influence over organized work, would not be helpful on account of the great diversity of subject matter included in anthropology, and might prove decidedly prejudicial on account of the necessity of developing this subject in different directions. Much better results would undoubtedly be obtained by regular meetings of representative scientists, and by the appointment of a secretary who would carry out the necessary clerical work.

Yours very respectfully,

(Signed) FRANZ BOAS, *Chairman*,

A. M. TOZZER,

ALEŠ HRDLÍČKA.

March 6, 1919.

THE TWENTIETH INTERNATIONAL CONGRESS OF AMERICANISTS.

The Organizing Committee of the XX I. C. A. has notified Dr. Hrdlička that the Congress, which was to be held in June of this year, has on account of the still unsettled conditions been postponed to June, 1920.

The Twentieth International Congress of Americanists.—On February 7, the Secretary General of the XIX Congress called a meeting of former officers and organizers of the Congress at the Smithsonian Institution to consider what steps would assure proper representation and participation in the Brazil session, to be held in June, 1920. Those attending, after electing Dr. J. Walter Fewkes as Chairman, expressed the unanimous opinion that the Brazilian Congress promised to be of more than ordinary importance, both from the point of view of stimulating the development of anthropological sciences in that country and of assisting in furthering international relations; and that in consequence every possible effort should be made to secure memberships for the Congress in this country, to add to its program, and to assure a good personal representation by delegates. On the motion of Dr. Geo. E. Kober it was further agreed to form at once an auxiliary organizing committee for this country and Canada, and to proceed with necessary publicity. The charge of forming this committee was entrusted to Dr. Fewkes and Dr. Hrdlička, the latter to serve as the Secretary of the Committee.

Applications for membership in the Congress may be made at once to, who should also be promptly informed of any communications that Americanists of this country may wish to present before the Congress. Scientific institutions and societies are requested to appoint delegates, and all persons who may have in mind to go to Rio Janeiro as part of the American delegation should communicate with the Committee.

The membership fee for the Congress is \$5.00. All communications relating to the Congress should be addressed to Dr. Aleš Hrdlička, U. S. National Museum, Washington, D. C.

RACE HYGIENE.¹

The highest aim of scientific medicine today and in the future is unquestionably the eradication of communicable diseases, and the

¹ Note furnished the Journal by Dr. Rupert Blue, Surgeon General of the U. S. Public Health Service.

most widespread of these, as well as the most dangerous to the race, are the venereal infections. The deleterious effects of these diseases on the whole human family and the necessary sanitation of the race in this direction, are matters of direct interest also to Anthropology.

An organized and properly directed, as well as sustained effort for the suppression of these diseases should enlist the deep interest and earnest cooperation of all public agencies in this country, and particularly all high grade periodicals, societies, and teaching institutions.

The present movement against venereal diseases in the United States is one of the numerous beneficial results of the War. The prevalence of these diseases in our civilian population was never shown as effectively as during the examination of the five millions of the youth of this country for the new army. This prevalence was seen to be such as to create a deep impression on all concerned. It was for the first time thoroughly appreciated that these diseases, if unchecked, will constitute one of the greatest dangers and obstacles to the future development of this nation.

The practical result of this was the issuance by the President on July 1, 1918, of an executive order placing all public health activities carried on by Federal Agencies under the supervision of the United States Public Health Service. On July 9, Congress passed an Act which created an Interdepartmental Social Hygiene Board, consisting of the Secretaries of War, Navy, and Treasury, and also a Division of Venereal Diseases in the U. S. Public Health Service.

It is on the above basis that the whole present activity of the Public Health Service combating the venereal evil and for teaching sex hygiene is founded. It is a work of wide scope, long breadth, and great patience. It will require many years to organize this movement in the best possible manner and to inculcate into our people an appreciation of the terrible nature of these loathsome diseases. But the work once so seriously but auspiciously begun, will proceed without cessation, as was the case in the fight against yellow and typhoid fevers and other scourges.

The Public Health Service in developing the agitation, has just addressed a letter to every medical, dental, pharmaceutical, physical education, osteopathic, and veterinary institution in the country, embodying its views on the subject in question and asking for cooperation. A similar letter is also being sent to every medical and allied journal and magazine, requesting those journals and magazines to give the letter and the campaign their full help in the matter of pub-

licity. A like letter is in preparation for every national, state, and city society of these professions.

A very important part of the whole venereal disease control movement is proper instruction of the youth of the country concerning sexual functions and hygiene. For this purpose, there will be needed many teachers, and these must be selected with great care. The man to teach such delicate and important matters must necessarily be a man of high quality. He must know human nature, must have a clear and sympathetic understanding of the subject and be able to present it in a form which will not offend even the most delicate sensibilities or give rise to any except wholesome thoughts, and at the same time, he must deal with the subject so as to leave a deep and lasting impression on the mind of every student and pupil. If he does not come up to these requirements, he will fail in his mission.

The most important thing confronting us, therefore, is to educate, is to raise, the future instructors in matters of the sexual function and of sexual hygiene. We must educate a larger class of efficient proselytes from those who are ultimately to be the future physicians and teachers.

In connection with these more direct fundamental efforts against the venereal plague, all possible encouragement shall be given to the generalization and perfection of physical education among all classes of children and older pupils, for it is recognized that a well-directed and enjoyable physical exercise is one of the most potent means for keeping the body and mind well occupied and in a healthy state. When most of the spare hours of our youth shall be filled with pleasure-giving and objective exercise or occupation such as calisthenics, sports, plays, trips into nature, practical gardening and arbor culture, the collecting of botanical, geological, and other specimens, etc., the boy and girl will have little time and inclination for unclean thoughts or practices.

The *Journal of the American Museum of Natural History*, New York, will appear henceforth as the "*Natural History*." It will be devoted to high class popular and educational articles in the lines of Nature, Evolution, Conservation, and all branches of Zoology, Anthropology, Geology, and Education. It will be issued monthly from October to May. The subscription price is \$2.00.

"*De Re Indica*."—This is a new periodical devoted to studies of the Indians. It is the "Organ of the Sociedad Venezolana de Americanis-

tas 'Estudios Libres', and will deal with "Anthropology, Ethnology, Linguistics, Folk-lore, etc.," of the native race. It appears in octavo, at Caracas, Venezuela, under the editorship of Dr. Julio C. Salas. The first number appeared in September, the second in October, the third in December, 1918, and future numbers will be published once or twice a month according to material. The subscription price is 24 Bs. per year. The three numbers so far received contain the following articles of more or less interest to physical anthropology: J. C. Salas—*Estudios Etnográficos*; A. Jahn—*Problemas Antropológicos*; S. D. Maldonado—*Sociología Antropológica*, L. Alvarado—*Noticia sobre los Caribes*; and J. C. Salas—*Etnografía del Estado Mérida*.

Buen provecho!

"*Japanese Medical Literature*."—The staff of the Research Department of the Severance Union Medical College, at Seoul, Korea, under the direction of Dr. Ralph G. Mills, is issuing in English brief abstracts of Japanese medical literature, some articles in which are of interest to physical anthropology and especially racial pathology. The abstracts are appearing in the China Medical Journal.

The important and most carefully assembled skeletal collection from the old Zuni Pueblo of Havikuh, representing a part of the results of two seasons' excavations at this ruin by Mr. F. W. Hodge for the Museum of the American Indian, New York, has been transferred in its entirety, to the U. S. National Museum.

Dr. Geo. L. Streeter, formerly professor of anatomy at the University of Michigan, and since 1914 research associate of the Carnegie Institution of Washington, has been appointed to take the place of the late Professor F. P. Mall as director of the department of embryology of the Carnegie Institution. There is a strong hope that the anthropological problems of embryology will as under Dr. Mall continue to receive due attention.

Dr. William Curtis Farabee has been elected a member of the American Philosophical Society.

Dr. Hrdlička has been elected an Honorary Fellow of the Royal Anthropological Institute of Great Britain and Ireland; also a member of the American Philosophical Society, and Corresponding Member of the Sociedade Portuguesa d' Antropologia e Etnologia.

During March, Dr. Hrdlička has delivered, under the "Richard B. Westbrook Free Lectureship," at the Wagner Free Institute of Science,

Philadelphia, four lectures on "The Origin and Antiquity of the American Indian; and during April he gave four lectures on "The Relations of Anthropology to Medicine" before the Medical Department of the Georgetown University, Washington, D. C.

On April 17, the Supreme Court of the District of Columbia convicted a pretended foreign scientist of offense against public morals and imposed the maximum penalty of one year in prison and a fine of five hundred dollars. The offense consisted in part of collecting a large number of photographs of nude colored young women in "artistic" poses and the defense was that these, together with the results of other more than questionable practices, were to serve for "scientific" and "anthropological" publications. The defendant claimed brazenly to be an anthropologist and went as far as establishing, together with some colored persons, of an "Afro-American Anthropological Society," the first act of which, as might be anticipated, was a wide application for financial support. This society made "observations," but no records. It finally developed that the best qualification for his claims as an anthropologist the man could produce was a degree of a forester obtained from a local foreign school; and when asked what was the cephalic index he said he could probably reply if allowed to consult a dictionary. It is high time that pretenders of this nature be shown up and dealt with as they deserve. The filth they deal with, whether for commercial or other purposes, has nothing to do with anthropology or any other branch of science, or of art. Chief Justice McCoy, before whom the case was tried, and the intelligent jury, deserve the thanks of anthropologists for making a due example of one of these individuals.

Dr. Poutrin, one of the promising young anthropologists of France, member of the Laboratoire d'Anthropologie of the Museum d'Histoire Naturelle, Paris, and collaborator of *L'Anthropologie*, after escaping the dangers of the war, has recently died in Paris of Spanish influenza.

American Journal of Physical Anthropology

ORIGINS OF THE PORTUGUESE

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I

Geographically speaking, Portugal is only a portion of the great Iberian peninsular unit, without precise ethnic or geographical boundaries. But the development of its people, and eventually their political independence, with consequently increased isolation, have favored the individualization of this ethnic aggregate in customs, language, and national feeling; moreover, nine centuries of history furnish the Portuguese nation with a firm traditional basis.* There are, however, as will here be shown, also archeological and anthropological reasons for Portuguese unity. To outline these we must go back to epochs in which naturally no trace existed as yet in the region in question of any national solidarity.

Regrettably our knowledge of the pre-historic and proto-historic times of Portugal is still full of gaps and obscurities. If, notwithstanding this and what has recently been written on the subject we cannot see the roots of the Portuguese nation in the sedentary epipaleolithic fishermen of Mugem, we may safely nevertheless recognize as our ancestors some of the Neolithic tribes who constructed the dolmens and the first *castros*, who inhabited the caverns, and who with rudimentary artistic feeling tried to represent their deities on curious plaques. These precursors of the historic Portuguese became in the course of time admixed with migrants of various origins, and the first trace of national individuality may perhaps be seen in the similarity of some of their industries in the proto-historic times. It is however only when Rome began to dominate the country that national

feeling shows itself, primarily in a heroic group resistance; and the very Romans who after the conquest organize the government and institutions of the country, give strength and shape to this feeling of individuality, which manifests itself eventually in a united mass—the Portuguese nation.

II

The Primitive Inhabitants of the Territory: Tertiary Man in Portugal.—In 1866 the geologist Carlos Ribeiro, in a study on the territory of the basins of the Tagus and Sado, alluded to silexes and quartzites that he found in ancient deposits there and that seemed to be the result of human work. In 1871 in a memoir to the Lisbon Academy of Science Ribeiro included nearly all these layers in the Tertiary and especially in the Miocene. The greater part of the supposed instruments came from the stretch of Miocene strata that extend northward from Carregado to Cercal, near the declivities of the chain of hills that passes in Alemquer. The Miocene conglomerations of the Tagus and Sado basins were deposited at the bottom of a Tertiary lake that once occupied the whole of that vast region. The first layers, which were contemporary with the igneous and irruptive action of the Lisbon basalts, in some places became later submerged by the sea and covered by maritime Miocene formations. These latter have not furnished any implements, but Carlos Ribeiro found numerous “eoliths” in the limestones, marls and lacustrine sandstone of the middle and upper Miocene.

These finds were discussed at the International Congresses for Prehistoric Anthropology and Archeology at Brussels in 1872, at Lisbon in 1880, and at Paris in 1889, as well as before the Prehistoric Society of France in 1905; and although no one hesitated to classify the geological layers as lacustral formations of the upper Miocene, opinions differed as to the attribution of the objects found to these strata, and as to the possibility of a presence at that remote time of an intelligent human or near-human being—though Mortillet did not hesitate to prematurely call this hypothetical being the *Homosimius Ribeiroi*.

The author examined the specimens in question, which are preserved in the Museum of the Geological Service at Lisbon, and verified in various the presence of “percussion conchoids.” But these silexes are very rough and it is hard to regard them as having a form preconceived by an intelligent, human or nearly human brain. Moreover,

their paleoethnological authenticity is doubtful, since it has been shown that eddies produced by currents of water, the pressure of the soil, atmospherical influences, and perhaps still other agencies, may produce pseudo-forms that are not inferior to these supposed authentic "eoliths."

In the actual state of our science, the Tertiary *Homosimius Ribeiroi* cannot be regarded as more than a bold conjecture, without sufficient documentary proof.

Paleolithic Man.—The Skull of the Arieiro Valley.—The Mandible of the Grotto of Furninha.—While many of the data referring to the Portuguese paleolithic undoubtedly need revision, we may nevertheless consider the existence of man in Portuguese territory in the paleolithic age as established, and it is also permissible to note that among the discovered sites relating to this period those of the inferior paleolithic seem to prevail. The greater number of these sites are on the surface of the soil and refer to the inferior or middle paleolithic, containing either Chellean, Acheulean, or Mousterian industries, or all these together. Many of these sites have not as yet been properly explored, and some, as those in Serra de Brunheira (near Chaves), Castelo do Quejo (Oporto), Ervilha (Oporto), Fontela (near Figueira da Faz), those in the neighborhood of Leiria, etc., furnished each only one or two worked objects of probable or proved authenticity.

The most important of these ancient sites in the north of the country is that at Mealhada (near Coimbra), discovered also by Carlos Ribeiro and studied by Joaquim Fontes. Here in Quaternary alluvia which contained fossil remains of *Equus*, *Elephas* cfr. *antiquus*, *Cervus elaphus*, and of the vegetal *Trapa natans*—contemporaries of the glaciers in the Mondego Valley—a *coup de poing* (at a depth of 3.3 meters), a scraper (at 2.4 meters), another scraper (at 4.2 meters depth) and a blade, were discovered, and all are considered as being either of Chellean or Acheulean age; but the particulars about the layer from which each object came are rather obscure. No skeletal remains of man have come to light in this locality.

The southern half of Portugal and especially the neighborhood of Lisbon, is even richer in paleolithic stations, among which we may refer briefly to the following:

In the grotto of Furninha (Peniche), Nery Delgado discovered a paleolithic deposit (besides an important neolithic one), that furnished some stone implements, various animal fossils, a bone ornament or amulet, and a fragment of a human mandible. According to Harlé,

the fauna of Furninha cave was composed of *Ursus arctos*, *Hyaena striata*, *Felis catus ferus*, *Felis lynx*, *Felis pardus*, and *Rhinoceros Merckii*. Besides a Chellean *coup de poing*, there were found here but on another level a point, a blade and three scrapers of Mousterian type, accompanying the fragment of lower jaw; and still on other levels were found chips of bone, a bone amulet or ornament and a sling-stone. Some other flint objects that Nery Delgado also produced from this locality, were not implements, in Joaquim Fontes' opinion. In opposition to Harlé's view Nery Delgado considers the contemporaneity of man and the striped hyaena in the grotto of Furninha as established.

Near the Spanish-Portuguese frontier, in the neighborhood of the cemetery of Arronches, the French archeologist Henri Breuil discovered a short time ago an important paleolithic site which is in an ancient terrace that dominates the actual river Caia by at least 20 meters. At a moderate depth in the mass of earth there is a Chellean industry of rough *coups de poing*, and another Acheulean, over the former, marked by chips, disks and *coups de poing*. So far this station has given us no part of the human skeleton.

In the district of Lisbon itself, Vergilio Corrêa counts no less than thirty-eight paleolithic sites. They are in general, however, represented by superficial deposits, and the authenticity of some is perhaps questionable.

If on the basis of the archeological data the existence of man in Portuguese territory in the paleolithic age must be considered as verified, nothing definite can as yet be said as to the physical type of these remote inhabitants. Has the *H. neanderthalensis*, who left his traces in Bañolas and Forbes-Quarry in neighboring Spain, extended as far as Portugal? Nothing yet proves it. Should we admit that the lower paleolithic civilization penetrated into the Iberian peninsula from the south and was of African origin, then the first settlers in the territory ought to have come by the same route and been of the same origin; but we are here in the field of nothing but hypotheses.

In the Arieiro Valley (Vila Nova da Rainha), a skull was found at a depth of 3.7 meters and was classified as *probably* Quaternary, but it was not accompanied by any implement or fossil that would allow its paleoethnological age to be determined. It was sub-brachycephalic and much like the Furfooz skull No. 2. Excluding this specimen on account of its doubtful chronology, the lower jaw from the grotto of Furninha, which Nery Delgado considers as probably belonging to a

child, remains the only document till now of the human type in the Portuguese Quaternary. Reduced however to only a part of the ascending ramus and one condyle, this specimen offers but little of interest to physical anthropology.

Epipaleolithic Man.—*The Skeletons of Mugem.*—Of all the discoveries relating to Portuguese prehistory, the most notable are undoubtedly those of the kitchenmiddens of the Tagus Valley, and that both on account of the characteristics of the industrial remains and because of the number and particularities of the skeletons that accompanied the artifacts.

The first of these middens was discovered in 1863 and three more followed in rapid succession, all located in the neighborhood of Mugem and Salvaterra de Magos. The most important, that at Cabeço da Arruda, was an elevation about 95 meters long, 40 meters wide and 5 meters high, above a sandy plain. It consisted of sand, mud, animal remains, flint-stones, fragments of carbonized wood and calcareous tufa, irregularly distributed. In the lower strata human skeletons were found with detritus of shells of *Lutraria compressa*, fragments of charcoal, etc.

The other middens were smaller but of a similar composition. They contained no pottery and only stone and bone implements. The molluscs that predominated were the *Lutraria compressa* and the *Cardium edule*, principally the former. As the *Lutraria* is not to be found actually in the Tagus at less distance than about 33 kms. up the Mugem and the other marine species are perhaps still farther off, we must draw the conclusion that the middens should date from a time in which the salt water came near them, and should have existed before the last ascensional movement of the soil which reduced the estuary of the Tagus to its actual location and size. The mammalogical fauna included specimens of *Bos*, *Cervus*, *Ovis*, *Equus*, *Sus*, *Canis*, *Felis*, *Meles*, *Viverra* and *Lepus* groups; but all the skeletal parts of these were not found proportionally, which makes it possible that the animals were hunted at a distance and only parts brought to the locality.

The human remains of the "kiökkenmöddinger" preserved in the Geological Service Museum of Portugal, belonged to about 200 individuals, skeletons of children and especially of women prevailing. The bones show no violence, except perhaps in two individuals, one with a circular depression in the forehead and the other with a fractured ulna. The savages of Mugem must have been a peaceful, sedentary population, living on game and fish, and backward in culture. They

are classified by Breuil in the Tardenoisian period at the end of the Quaternary, the period of transition from the old to the polished stone age. Their civilization might perhaps have been more connected with the Aurignacian than with the Mousterian; and its origin, as that of the Aurignacian, might have been meridional, mediterranean or African.

There is no homogeneity of physical type in the skeletons found at Mugem. Brachycephaly shows itself in a smaller proportion of the skulls than dolichocephaly, although in a much greater proportion than in the actual population of the country. The dolichocephals of these stations present a type characterized by low stature, highly developed supraorbital arches in masculine skulls, occasionally a sloping forehead, high vault, and small cranial capacity. The anterior sutures of the vault are rather simple, the lambdoid complicated. The face is rather long, orbits generally low, nose mesorhine, zygomae slightly prominent, prognathism accentuated, chin prominent, gonion salient. The humerus is frequently perforated, femurs pilasteric, tibiae platycnemic.

This dolichocephalic type, which we designate *Homo afer*, var. *taganus*, was identified with the neolithic race of Baumes-Chaude, and with the average contemporary Portuguese. We have lately shown, however, that this identification is not exact and that the *Homo taganus* should rather be included in a group of inferior races, Australoid or protoethiopian and probably of meridional origin, agreeing with the route of Tardenoisian civilization. The small cranial capacity, mesorhine, prognathism, occasional sloping forehead, low stature, etc., are characteristics that separate *H. taganus* from the man of Baumes-Chaude, the racial pattern of the Mediterranean and actual Portuguese type, having a more voluminous skull and being leptorhine, orthognathic, with a vertical forehead, and though not tall still of a higher stature than the *Homo taganus*.

On the basis of measurements of the long bones of the skeletons of the "kiöckenmöddinger" taken by Paula e Oliveira, the author has calculated the following averages for some of the principal indices of the skeleton, which are compared with the corresponding figures (ascertained provisionally) in a numerous series of modern Portuguese:

	SKELETAL INDICES	
	Kitchen-middens males	Modern Portuguese males
Antebrachial index	78.8 (6 cases)	74
Tibio-femoral index	80.5 (8 cases)	81
Humero-femoral Index	69.4 (5 cases)	73
Intermembral index	70 (3 cases)	70

In the intermembral and tibio-femoral indices the epipaleolithic skeletons of Mugem do not seem to differ from those of the modern Portuguese. But the humero-femoral index shows some difference, and that of the antebrachial index is still more notable—it corresponds in the Mugem man to meso-dolichocercy like that of the Negroes and Australians and is clearly different from the brachycercy of the Europeans and contemporary Portuguese.

The brachycephals of the “kiökkenmöddinger” do not all belong to one type. Among them may be distinguished the *protobrachymorphus*, having a trapezoidal outline, narrow forehead, and vertical occiput; the *protosphenoid*, perhaps similar to the former, but with less accentuated characteristics; and the *orthobrachymorphus*, having a wider and sloping forehead, moderately convex occiput, rounded horizontal outline, high orbits, mesorhiny, prognathism and a more Mongolian appearance. This last type is recognizable in skull No. 1 of Mugem, and in one from Moita de Sabastião.

These types are three of the five forms we think we can distinguish in the primitive brachycephals of Europe. Leaving out the *orthobrachymorphus*, slightly Mongoloid, the brachycephals of Mugem correspond to the *Acrogonus* of Lapage, to the *protobrachycephals* of the neolithic age (Grenelle type), and to the invaders of Britain in the bronze age. Keith distinguished these last from the ancient and modern continental brachycephals who have a globular skull, convex occiput, with only moderate prominence of the supraorbital ridges, and who resemble the Alpine type whose primitive specimens we group in our *neobrachymorphus*.

The kitchen-middens of Mugem, together with the Azilian station at Offnet (Oriental Bavaria), constitute the most ancient definitely ascertained paleoethnological deposits in which brachycephaly appears in the European *Homo sapiens*. For a long time it was supposed that the first brachycephals of Europe were the introducers of the polished stone and of the dolmens; Mugem and Offnet do away with such a hypothesis. It is now recognized that even if we should attribute to these populations—which may be contested—the paternity of the Azilio-Tardenoisian civilization, their contribution to culture was very small. The miserable fishermen of Mugem were far from the standards of the Magdalenian civilization, their antecessor in Europe.

III

Neolithic Man.—Remains of the civilization of the polished stone age abound in Portugal, and range from numerous isolated implements to important, well characterized and already well explored sites, with skeletal remains. In this category belong the many dolmens, called in the country *antas*, and which popular legend attributes to the Moors, to whom, as it happens, the people wrongly attribute other prehistoric and protohistoric remains. Other *tumuli* of various types, known as *cistas*, *antelas*, and *antinhas*, exist in Portugal. The heaps of clay that cover some of the dolmens are commonly called *mamoas*, on account of their mamillary form. The defensive works of the neolithic age are represented in Portugal by *castros* and *cercas*. The former are fortified inclosures, situated on tops of hills, and constitute in the greater part documents of the Lusitano-Roman rather than the older civilization. Among those that date from the neolithic age may be mentioned that of Siccia, near Barcarena.

If some of the neolithic populations lived in villages, encampments and fortified inclosures, there were also some troglodytes living in natural and artificial grottoes, such as those in Cezareda, Furninha, Poco Velho (Cascaes), some in Alcobaca, those in Santo Adriaio (Trazos-Montes), etc. It is also possible that there were lake-dwellings, as there are still today in Lavos.

The Portuguese neolithic peoples probably lived in tribes, having different cultures and habits, but in intercourse with one another and even with foreigners, as shown by instruments made of materials that could only be obtained in distant regions, and the similarity of archeological remains found in places far apart. It is even possible that in the neolithic age the west coast of Iberia was a region of maritime contact between the Mediterranean and the countries of the north of Europe. According to Carlos Ribeiro, the settlers in Portuguese territory at the end of the polished stone age knew the domestication of animals, and used vegetables for food. It is possible that they dedicated themselves to agriculture. It has been verified by osteological specimens from the grottoes of Furninha and Cezareda, that some of the tribes of this period practised trephining.

All the bones found in neolithic sepultures have not as yet been used for systematic study of the physical type of the people who lived in what is now Portuguese territory at that period. Paula e Oliveira registered his observations from skulls found in the grottoes of Cezareda and Carvalhal (Aljubarrota); in the dolmen de Niza, in the caverns

at Montejunto and Alcobertas, in the sepulchre at Folha de Barradas, and in the station at Liceia. Ferraz de Macedo examined some specimens from Algarve but did not publish his conclusions. Ricardo Severo and Fonseca Cardoso studied some fragmentary remains from the neighborhood of Figueira de Foz; while the author examined some cranial fragments from a dolmen, submitted to him by Vergilio Corrêa, and also studied some neolithic specimens in the Geological Service Museum of Portugal. From all these observations it is possible to conclude that the neolithic population of Portugal was heterogeneous. A predominant type is found in the dolmen at Niza, in Casa da Moura, in Montejunto, Alcobertas, Folha das Barradas and perhaps in other stations. It is dolichocephalic, but different from the Tardenoisian dolichocephal of Mugem and more like the French neolithic type of Baumes-Chaudes.

Subdolichocephalic and mesocephalic forms were also observed in the grottoes at Cezareda, in Montejunto, in Algarve, etc., being perhaps the results of mixtures between dolicho- and brachycephals. According to Ferraz de Macedo, cited by Leite de Vasconcellos, the skulls of Algarve are mesorhinic, but those of Cezareda are slightly leptorhinic. Brachycephals and sub-brachycephals are represented in a cranial fragment of Casa da Moura, in a skull from Liceia, in a skull-cap from Carvalhal, and in one specimen from Algarve. The three first on account of their trapezoidal outlines and vertical occiputs were included by the writer in the European proto-brachymorphus, already represented in Mugem. According to Ferraz de Macedo the Algarvian skull is mesorhinic.

In some skeletons belonging to the Portuguese neolithic age we find platycnemy, a deep-fluting of the fibula, a marked development of the upper curve in the ulna, and perforation of the septum in the humerus. But the platycnemy and the perforation of the septum are more frequent in the before-mentioned kitchen-midden bones.

The reconstitution of stature from the dimensions of the long bones of this period in Portugal, gives in general figures below the medium. One femur, one ulna and one radius in Cabeço dos Moihnos, near Figueira, give the average of 150 cm.; in Cabeço do Facho, also in the neighborhood of Figueira, the average is 160.5 cm.; and in the Alqueves cave a femur indicated the height of 163 cm. Paula e Oliveira found greater dimensions in the long bones in the neolithic stations he studied than in those of Cabeço da Arruda, and these dimensions agreed with a more voluminous skull.

Nery Delgado found bones of such extraordinary dimensions in the grotto of Furninha, that he raised the hypothesis of the existence of a gigantic or at least uncommonly tall race, in the Portuguese neolithic age. Nothing comes as yet to confirm this hypothesis.

We may conclude, on the whole, that during the neolithic age what is now Portuguese territory was inhabited by tribes of different anthropological origin. Among them seem to exist not only relations or descendants of the more remote fishermen of Mugem, but also representatives of new types such as the French Baumes-Chaudes variety. The neolithic population of the Iberian occident did not present, therefore, in its physical type, or in its culture, such ethnic individuality that we could trace to it the origin of the Portuguese nation. But even if that population did not as yet constitute definite national aggregation, there can already be seen in it ethnic elements which took an important part in the anthropological composition of the actual population of the country. Some—such as the proto-brachycephals—are later eliminated, absorbed or transformed; but others, such as the dolichocephals of Baumes-Chaudes, contemporaneous with the construction of the dolmens and of the first castros, help to form a great part of the Portuguese population of today.

IV

Protohistoric and Historic Peoples.—Metal Ages in Portugal.—It is not easy to distinguish in the metal epoch in Portugal what belongs strictly to prehistory and what is in the dominion of protohistory. Besides this, the archeological and anthropological documents relating to these times are not so abundant in the country that we could classify and systematize them chronologically with the necessary exactness and detail.

The eneolithic period is represented in Portugal by some sepulchers in the south of the country, by the crypts of Alealar, by the artificial grottos of Palmella, by some traces found in the neighborhood of Figueira, etc. The sepulchral grottos of Palmella offer similarities to other necropolis of this time in Spain, France, Ireland and Sicily. The domed tombs of Alealar are like others of the Peninsula (Millares), and, according to Dechelette, seem to be derived from a prototype of the east of the Mediterranean (primitive Minoan culture).

As in the neolithic era, Portugal during its metal age continued under foreign influence. It lay in the line of the maritime route from the eastern Mediterranean and Aegean to the countries of the north

of Europe, whence tin, gold and amber must have come during this epoch and even afterwards. As Dechelette assures us, the maritime route by the Atlantic made the fortunes of the people of Tyre, Sidon and Tartesse, and not only did the coastal trade result in uniting these peoples with the natives of Portuguese territory, but also the riches of the latter could not but attract the former. The Iron Age in Portugal must have commenced late considering the facility of obtaining bronze owing to the richness of the territory in tin and copper. The necropolis of Alcacer do Sal, where traces of Greek industry were found, must belong to the first part of this age (Halstattian). Besides Phoenician and Punic, we meet during this period not infrequently also with Hellenic influence, and eventually with that of the Romans. In the Roman time flourished many *castros*, *castelos*, *citánias*, and *cividades*, villages situated on the top of the hills and generally fortified. They were particularly abundant in the north and center of the country—places where the people of the plains took temporary refuge when threatened with danger. In general these places show a poverty and cultural backwardness of the inhabitants. Moreover, with all the external influences the evidence shows that the Iberic peoples maintained many of their own ancient customs and much of their individuality.

The Immediate Predecessors of the Portuguese People.—Either through the imagination of some old Portuguese historians, who wished to trace their fellow countrymen's origin from some aristocracy and with this end made them descendants of personages and tribes from the bible, from ancient mythology or from classical history, or through some of the hypotheses of learned contemporaries—the origin of the Portuguese people is attributed to innumerable different sources. But few seek their principal ethnic affiliation with the neolithic nucleus of Baumes-Chaude, which on scientific grounds appears the most probable. Many make the Portuguese a confused and intricate amalgam of protohistorical and historical peoples that must have come to Iberia in successive migrations.

Onomastic affinities perhaps are responsible for the assertion that Tubal, Japheth's son, commanded the first settlers in Lusitania, landing with them in the place now called *Setubal*. In the same way the foundation of Lisbon (*Olisippo*) was attributed to Ulysses. The same thing happened in the case of Lusitania, which was supposed to get its name from Bacchus's son Lysas (*Lusus*), ancient king of Lusitania. Whether these are mere fancies, or traditional recognitions of the

operation of ancient eastern Mediterranean influences on the western Iberian coast, cannot be verified.

Recently claims have been made that the Iberians were the first settlers in the land, some considering them as autochthonous, others as comers from Africa. The Lusitanians would probably have been Iberians or Celtiberians, that is, the issue of the fusion of the Iberians with the Celts—the invaders of their country. For others the Ligurians had the priority in the Iberian *Meseta*. Schütel, considering the Lusitanians as Iberians and asserting that the Celts preceded the Iberians (of African origin) in the *Meseta*, gives the Ligurians as the primitive population of the Peninsula and suggests that the Basques constitute their survivals. D'Arbois de Jubainville, extending the Ligurians over the whole of Western Europe, attributes to them the megalithic monuments and the civilization of the polished stone age (which he does not distinguish from the bronze age). The Portuguese archeologist Martins Sarmento tried also to establish the Ligurian affiliation for the Lusitanians, even drawing up an etymology of the name: *ligus*—*ligusitanus*—*liusitanus*—*lusitanus*. The Celts are equally favored in this connection. For a long time nobody would believe in the existence of pre-Celts in the country. Without challenging this, Piuho Leal gives to the word Lusitania a celtic origin: *lous* (warrior) and *tan* (country)—country of warriors.

The facts are that it is not as yet possible to identify the prehistoric settlers in the Portuguese territory with the first peoples cited by texts in the European west. Perhaps the origin of the Tardenoisian civilization makes clear the meridional source of the *Homo taganus*, and of the proto-brachycephalic type of Mugem that, having its cradle in Asia, would have accompanied the *H. taganus* along the northern coasts of Africa, while another migratory wave was going up the Danube as far as Eastern Bavaria (Ofnet). In its turn the neolithic dolichocephalic race offers the same characters as the modern "Ibero-insular" or "Mediterranean" race, often supposed to be no other than that of the old Iberians. But the oldest texts do not permit the extension of the designation of Iberians to other peoples than those who inhabited the neighbourhood of Iberus or Ebro, such a designation being possibly more geographical than ethnic. On the other hand, when in the sixth to the fifth centuries B.C. Hecateus of Miletus made the most remote historical reference to the Iberians, southeastern Spain had been for a long time already inhabited by people anthropologically mixed, as those of the necropolis of El Argar.

It is not necessary nor credible that to an ethnic individuality there be always a corresponding anthropological individuality, for all the peoples in history.

The Ligurians are cited by the texts long before the Iberians; but even so it is difficult to form a connection between them and any of the neolithic elements of Portugal. The Bronze Age commenced in Gaul about the second half of the third millenium before Christ, and only in the eighth century B.C. does Hesiod make the earliest known historical reference to the Ligurians. However, archeology permits the consideration of the Bronze Age as the Ligurian period *par excellence*; but it does not admit that the ethnic designation of Ligurians be carried on to the Neolithic Age—and especially to the Neolithic Age in Portugal. At all events admitting (not proving) the existence of the Ligurian brachycephalic type, there might have been some relations between them and the distribution of the megalithic monuments, the migrations of the European protobrachycephalic tribes, and, perhaps too, the actual distribution of the broadheadedness on the European coasts. The invasion of Great Britain by the proto-brachycephalic tribes in the Bronze Age would concord with the existence of Ligurian settlements in that country in protohistoric times, and with the relations of Ligurians with the North especially in the amber traffic. But such identifications are at least premature. In short, it is not only certain that we know little of the physical characteristics of many of the first peoples mentioned in history, but it is also clear that the ignorance of ancient authors about some of these peoples, such as the Iberians and Celts, is remarkable and even confessed by themselves.

The presence of the Ligurians in the Iberian Occident in protohistoric times, is still more uncertain. We have seen that it is not possible to trace them to the neolithic time as a definite ethnical entity. But their coming in protohistoric times, at least, has been actively defended. A passage in the *Ora maritima* by Festus Avienus, which may have been inspired by a Phoenician periplus of the sixth century B.C., suggested this assertion. The work in question gives the "*pernix Ligus*" with the Draganes situated "*sub nivoso maxime septentrione*" near the Cempsí and Sefes that inhabit "*arduos colles*" in the field of Ophiusa (designation of the western coast of Iberia). But the "*editio principis*" contains *Lucis* not *Ligus*, and the expression "*sub nivoso maxime septentrione*" may as easily refer to the north of Portugal as to that of Spain or to the northern countries of Europe—Great Britain for instance. It is the same Avienus who speaks of the expul-

sion of some Ligurians from the frozen regions of Ursa, by the Celts. The worship of the God Bormanicus in Vizela, the radical *asc* in the name of the mines of *Vipascum* in Alemtejo, the designation of the river *Durius* (the same as that of a tributary of the Po), and other isolated elements, are not enough to sustain the hypothesis of a Ligurian presence in the peninsular occident. Nevertheless, for geographical reasons analogous to those invoked for the Greek influence and with knowledge of the historical fact of the existence of the Ibero-Ligurians in the Spanish southeast, it is possible to admit this hypothesis. The Ligurians, besides being agriculturists, were merchants and travellers. Their terrestrial and maritime commerce with the north is known, and the attractiveness of the Portuguese mines must have brought them there, although probably more as merchants than as colonists, considering the rare and questionable traces they left in the country.

If we accept the chronology indicated for Avienus's poem, the most ancient peoples mentioned in the texts as inhabitants of the western belt of the Peninsula would have been, from south to north, the Cynetes, the Cempsii, the Sefes, perhaps the Draganes and those designated as *Lucis* or *Ligus*. The Tartessians are generally placed in the basin of the river Betis (Guadiana) as far as the Iberus, where Avienus places the Iberians. Herodotus (fifth century B.C.) however places the Tartessians among the Iberian tribes, which is in contradiction to the Ligurian descent that Martins Sarmiento wished to give them. The Cynetes, Cynesii, Cunetes, Cunei or Conei, probably dwelt near the Sacer promontory (near Cape St. Vincent), there being similar uncertainties in their ethnic affiliations. The Anas seem to have separated them from the Tartessians, their neighbors on the east. They occupied thus the region corresponding to the actual Algarve. The position of the Cempsii and Sefes is more problematical. If, in Avienus's poem, instead of *jugum Cepresicum* (Cape Espichel), we read *jugum Cempsicum*, as some say it should be, then the Cempsii would stretch perhaps to the boundary of the territory of the Cynesii. The references to the Cempii in the biographical and historical texts, however, are few in number. Avienus in another poem extends their territory as far as the Pyrenees, and in the third or fourth century of the Christian era Dionysius says that the Cempsii inhabited "*ad radices Pyrenaei*." In Priscian, who later on paraphrased Dionysius, we also find a reference to this people. Still more enigmatical are the Sefes, whom some writers try to identify with the Gletes set by

Herodotus to the north of the Cynetes. No reference to such people appears except the one made by Avienus.

Similar doubts and obscurities involve also the Diaganes which, with the *pernix Lucis* or *Ligus*, the Phoenician periplus places "*sub nivoso maxime septentrione*" near the Cempsî and Sefes. The text which does not settle the position of the former as clearly as it does that of the two latter, places "*Ophiusae in agro*," which allows us to doubt that they were really the inhabitants of the region corresponding to actual Portugal. If we admit that they were natives of "*Ophiusae frons*," could we not then, instead of correcting *Lucis* into *Ligus*, rather read *Lusis* or better still *Lusus*? This would be the most remote reference made to the Lusitanians, who only in the second century B.C. commence to be mentioned in other texts.

In the fifth century Herodotus affirms that, with the Cynetes in the extreme occident of Europe there were Celts. In the fourth century Ephorus also speaks of them as inhabiting the west, and Aristotle places them "above Iberia, in a severely cold region." According to Aristotle, the way of Hercules leads from Italia to the Celts, Celti-Ligurians and Iberians. Understanding Iberia *strictu sensu*, the north of Spain would thus be indistinguishable from the northern regions of Europe, where from the second century onwards the writers place the Celts. Polybius in the second century B.C. refers to the Celts and Celtiberians of Iberia. A passage of the anonymous periplus of the first century B.C., attributed to Scimnos Chii, leads us to suppose that the sources of the Tartessus were peopled by Celts. In the beginning of the Christian era, Diodorus Siculus restricts the designation of Celts to peoples beyond the Pyrenees, but speaking of the contests between the Celts and Iberians in Spain says that in the end the two peoples got mixed giving birth to the Celtiberians. His contemporary Strabo, while also placing the Celts beyond the Pyrenees, locates some Celtic tribes in Iberia, especially in the west; in between the Tagus and the Anas he places a majority of Celtic tribes with a minority of Lusitanians; and to the north of Lusitania, in the extreme northwest of Iberia, he also locates peoples of the Celtic nation, believing them to be near relatives of those then inhabiting the banks of the Anas. To the east of the Carpentani, Vettones, Vacceus and Calbeci (included by some in the Lusitanians and which Strabo seems to consider rather as neighboring tribes of the Lusitanians on the east), he places the Celtiberians. In the first century of the Christian era, Pomponius Meta, saying that the Artabri belong to the Celtic nation, locates a

Celtic people to the north of the river Douro. In the same century Plinius says that the Celts of Beturia (those of the southwest), from between the Betis and the Anas, came from Lusitania and are a branch of the Celtiberians. In short, the texts from the fifth century B.C. leave no possible doubt of the presence of Celts or Celtic tribes in the west of the peninsula. Onomatology confirms these assertions and even permits us to suppose that they existed between the Tagus and Dours, a region where the texts do not make any clear mention of them. It seems, however, judging from archeological data, that the influence of the Celts did not prevent the Iberian peoples from preserving till quite late their own ancient customs, as Dechelette observes. On the whole, the Celtic dominion in Portugal, as in Spain, seems to date from the sixth century B.C., up to the Carthaginian conquest at the end of the third century. Its influence in some parts seems even to have been felt till the time of the Romans.

The Phoenicians, archeology permits us to suppose, came to the western coast of Iberia in very remote times, and history confirms the maritime expeditions of the Phoenician people on this side of the columns of Hercules. They were probably attracted by the natural richness of Iberia and the northern countries. About the twelfth century B.C., the important Gades colony (Cadix) must have settled in the south of Iberia. The Semitic-Phoenician type was established by Fonseca Cardoso in the piscatory population of the actual Pavia do Varzim. It is still to be determined, however, to what extent Phoenician influence made itself directly felt in Portuguese territory, and how far it worked through its settlers in Tartessus, through the Carthaginians or Libian-Phoenicians, whose activities in the Peninsula are historically much better established.

The Carthaginians, according to Avienus, are said to have had settlements on this side of the pillars of Hercules, certainly in the region of the Tartessus, already in the sixth century B.C. The conquest of the peninsula by Amilcar commenced in the third century B.C., and in the second century Polybius speaks of Carthaginians in the country of the Cunei or Conii and in Lusitania.

The coming of the Greeks to Portuguese territory is not so positively confirmed as is their coming to the northeastern and southern parts of the Peninsula. Archeological data, geographical considerations (the Greek peninsular colonies in the neighborhood, the relative proximity of the Phocian colony of Massalia—Marseilles) and the more or less vague allusions of some texts, lead us to admit that peoples

from Greece and her mediterranean settlements might have landed in western Iberia, and the remarkable beauty of the present day women of Ilhavo (Aveiro) appears to give support to the supposition that some of the peoples of the Portuguese coasts were of Hellenic descent; but the actual presence of the blood of old Greece in present day Portugal has not as yet been confirmed by anthropology.

V

The Formation of the Historic Portuguese Nation.—If Avienus be excluded, we commence speaking of Lusitania and Lusitanians in the time of the Carthaginian and Roman dominions in the peninsula. Until then the ethnographical conceptions of western Iberia are extremely obscure and confused, and the natives are considered as barbarians even by their rulers.

Diodorus Siculus includes the Lusitanians with the Iberians, saying they were the strongest of all, and placed their villages on the tops of bare hills. These villages were the *castros* and the *citancias* of the archeologists. Strabo encloses Lusitania by the following boundaries: on the south the Tagus, on the west and north the Ocean, and on the east the Carpentani, Vettones, Vacceus and Callaeci—included by others in the Lusitanians. However, the territory bounded by the river Douro on the north, the Ocean on the west and south, with the Guadiana and boundaries of the Betica on the east, was understood as the Roman province of Lusitania.

The historical Lusitanians used to dwell between the Douro and the Tagus, some however passing to the south of the Tagus. The relations and connections between them and the Bracari, Callaeci, Artabri and other peoples from the territory north of the Douro, and Carpetani, Vettones, Vacceus, Turduli, etc., are not very clear. Without doubt it is not a question of one people that occupied the Iberian occident at that time but of different tribes, which if not homogeneous, had at least established among themselves certain connections.

Among these tribes those who were most remarkable for their number, valor, patriotism, customs, etc., were doubtless the Lusitanians, for only thus can we explain the especially important place that the contemporary writers of the Carthaginian and Roman occupations give them in their works. If Lusitania does not fit exactly within the boundaries of Portugal of today, and if there is not an exact identity between the Lusitanians and Portuguese, it cannot be denied that among the historical natives of the territory the Lusitanians consti-

tuted the most important nucleus of the future Portuguese population. With the wars between the Lusitanians and Romans, with the heroic feats of Viriathus, Portuguese history is born, and the Nation arises.

Bringing the country at last under its dominion, Rome gives these peoples unity of language, unity of law, and the strongest instrument of popular supremacy: the *municipium*. These preserve the forces of the growing nationality through subsequent invasions and also through the threats of feudalism.

We shall not stop to give details of the invasions of northerners, which follow each other from the beginning of the fifth century in Lusitania. To the north of the Douro settled the Vandals and Suevi, of Germanic origin, to the south of the same river the Alans, who were not Germanic descent, and in the extreme south of the country of some branches of the Vandals, the Silingues. These dominions lasted however only a short time, the one that endured longest being that of the Suevi. Other northern invaders, the Visigoths, came to take possession of the country. Their rule continued for nearly three centuries. Their empire in Spain ended with the battle of Guadalete in 711.

We can attribute but little ethnogenic importance to the Vandals and Alans in Lusitania; but that of the Suevi was greater and still more important was that of the Visigoths. However, naturally inferior in culture to the Romans, the northern invaders assumed little by little, in spite of their military and political predominance, the Luso-Roman civilization. After all, they only constituted a warrior class that later, on the reconquest of the country from the Arabs, initiating and founding by arms the modern Iberian nations, fulfilled the aspirations of the natives with whom they have become identified in customs and language. As the Romans, they were to a certain extent instruments of the supremacy of the people whom they subjugated less deeply than is generally supposed.

The Arab and Berber dominion ran, in alternative periods of tolerance and despotism, from the eighth till the end of the first half of the thirteenth century. Some authors affirm that the Iberian peoples did not feel towards these invaders (as they did not feel for the Carthaginians many centuries before) the natural antipathy which is dictated by disparity of race. The facility with which the invaders adapted themselves to the native customs and organizations and also the ease with which the natives adopted the customs and political rule of the former, are signs that between them there was no essential antagonism.

When the Christian knights of the Reconquest tore a great part of the present Portuguese territory from the Arab dominion, there existed in that territory a free population. Siding with the kings against the threat of feudalism, the municipia and the people found in the monarchs the guarantees of a national unity which the military aristocracy threatened to crush. We must note that the separation of Portugal from Leon and Castile was accomplished more easily than might be supposed. The wars between the Portuguese and Castilians in the early days of the Portuguese Monarchy nearly always rose more from court intrigues or from disagreements about the possession of the frontier lands, than on account of the all important question of Portuguese independence. This cannot be explained by an artificial division of lands among military chieftains or heads of aristocratic families, nor by feudal customs which brought the kings to recognize the lords as nearly their equals and to give them absolute supremacy, near to independence, in their territories. The true explanation is that even before Count Sisnandus, Count Henry and Alphonsus I, Portugal was already a nation. When in 1383 Don Ferdinand died and dynastic combinations threatened to place Portugal under Castilian rule, it was the popular feeling, the soul of the nation, that armed Don John I and lead Nun'Alvares to the victory of Aljubarrota. At that date many representatives of the higher classes in Portugal did not know the patriotism that the more common people felt for a long time; but they compensated for this defect in 1640 by revolting against the dominion of Philip IV.

Migrations and Ethnic Influences in the History of the Portuguese Monarchy.—Even after Portuguese territory had been taken from the Saracens, many individuals of the vanquished people remained in the land of their conquerors. The Saracens were called *Mouros* (Moors) in this country. Legends and tradition tell us of their presence under a tolerant government, and even today there is a ward in Lisbon which still keeps the name of *Mouraria*.

The judaic migration came rather slowly and silently later. When in 1497 Don Emanuel I decreed the expulsion of the Jews, they constituted an important part of the population of the country. After this, the history of the Inquisition in Portugal contains many documents proving their presence during all dangers and persecutions, though disguised as *panussim* (literal translation: forced) or *nosrin hadash*—new Christians. Even at the present day there are in Holland descendants of Jews expelled from Portugal in the fifteenth century

who still speak Portuguese. The best known colonies of *Sepharadim* (Jews of the west) settled in Portugal in the Penamacor, Trancoso, Brazanca, Meza-Frio and Covilha, not to speak of Lisbon and Oporto. Some survivals of these exist to the present day in the country.

The Gypsies also reached Portuguese territory. Some authors of the sixteenth century and later mention them here, and there are various laws decreeing their expulsion from the country, where however they managed to remain to this day, especially in Alemtejo. They are designated by the name of *ciganos* and they call themselves *calo, cale, calli, rom*. They do circus work in provincial fairs, deal in cattle on a small scale, read fortunes, and steal. Also a few are metal-lurgists, and a few basket-makers. They speak Portuguese, Spanish and Rumanho. According to Adolpho Coelho the latter is a kind of bad Spanish, mixed up with special words in the greater part of gypsy origin. In Portuguese slang there are many of these words; the very name given to slang—*calão*—is one.

From the era of the maritime conquests and discoveries rather interesting migratory movements took place between Portugal and India, Africa and Brazil. There was a moment in history in which Lisbon turned into nearly a cosmopolitan center to which people flocked from the most distant lands. The slave trade in the sixteenth century and afterwards brought undoubtedly also many African negroes to Portugal. Some of these turned *forros* or freed, went to provincial places and set up small shops, usually little taverns. They became common in the type of black innkeepers. Their intermarriage had greater effect, however, in some populous centers than in the provinces. Still they left no important traces in any part of the country, either on account of the return of their mixed progeny to the predominant native type, or because of the great dilution of theirs in the total mass of native blood. The affirmation of some authors that, especially in Lisbon, an enormous part of the population is made up of mulattoes, is not true.

Ethnic relations of Portugal with European countries of the west, continued in historic times. Naturally Spain heads the list. Galicia above all gave an important emigration to Portugal. But the English, the French, and other Europeans became also represented in the country, chiefly in the populous centers on the coast, Lisbon and Oporto; thus a great many of the merchants in Oporto are of British or German descent. Formerly the river Douro was frequently visited by ships from Flanders and other northern lands that left settlers.

These accretions, however, together with those of the Napoleonic invasions and drafts of English soldiers to the peninsula in the beginning of the nineteenth century, the invasions of Norman and Algerine pirates of parts of the coast in the commencement of the monarchy, and in more remote times, in the twelfth and thirteenth centuries, the expeditions of crusaders who on their way to Palestine disembarked on the coasts of Portugal, had not the ethnographic importance of the larger colonizations.

It is thus seen that Portugal, in the course of its history, has sheltered peoples of many different origins; yet in spite of this Portugal is today one of the least heterogeneous countries in Europe from the ethnic point of view.

VI

Anthropometric Data.—The anthropometric data registered on Portuguese protohistoric skeletal remains are, so far, few in number. Only in the eneolithic series of the grottos of Palmela could it be verified that the cephalic index ranged from dolichocephaly to sub-brachycephaly. It was supposed that the necropolis in the neighborhood of Cascaes (Alcoutão and Abujarda) were contemporary to Halstattian or at most Roman civilization, but today they are considered Germanic. The thread of the anthropological evolution of the population of the Portuguese territory can be definitely picked up only in the epoch of the Roman dominion. In Ferraz de Macedo's manuscript notes we see that out of 12 masculine skulls of the Roman period at Algarve, there were two sub-brachycephals and one brachycephal, while among fourteen feminine skulls from the same locality were found five sub-brachycephals and one brachycephal. This corresponds to approximately 35 per cent of brachycephals and sub-brachycephals to 65 per cent of meso- to dolichocephals. If we consider that in Portugal the percentage of brachycephalic skulls today is from 6 to 8 per cent, the percentage in Algarve during the Roman epoch is seen to have been much greater. It is true that that province is still one of the least dolichocephalic ones in the country, but among skulls of the Arabian times in Algarve Ferraz de Macedo's reports only speak of dolichocephals.

The nasal index in two skulls of Algarve—one mesocephalic, the other subdolichocephalic—was respectively 38.7 and 48. The difference is marked although both are leptorhine. The orbital index was respectively 80.7 and 100; while a sub-brachycephal (No. 9) gave orbital index of 94.6. The cranial capacity was generally large.

In a cemetery in Viana in Alemtejo, belonging to the fourth or fifth century A.D., some skulls were found from the photographs of which Costa Ferreira believed they were dolichocephals "of the primitive race of the peninsula." Two others he thought represented mixtures of dolichocephals and brachycephals, with vertical norma distinctly pentagonal, and wide face, orbits and nasal opening. The nearly square outline of the face, horizontality of the lower edge of the maxillae and the rounded form of the chin, reminded Ferreira even of certain Roman skulls.

Ferraz de Macedo found sub-dolichocephals, mesocephals, only one dolichocephal and no brachycephals, in a series of supposed Lusitanian and Roman skulls from a necropolis at Vila France de Xira. In the necropolis of Nossa Senhora do Desterro, near Figueira, Ricardo Severo and Fonseca Cardoso found dolichocephaly in a skull (cephalic index 70.3) with the stature calculated from a femur and a tibia of about 162.8 cm. In the cemetery of Ferrestello, also near Figueira, the same authors took some measurements on three skulls and ten long bones. The two masculine skulls were both dolichocephalic; other measurements in one of them show a long face, low orbits and leptorhiny. The feminine skull was mesocephalic, with microseme (near mesoseme) orbits, a little shorter face, nasal aperture mesorhinic. The stature calculated from nine masculine bones averaged 161.8 cm.

The lined sepulchers of Cascaes furnished some skeletal remains of the Germanic epoch. Among these was recognized the nordic type, tall, long headed, leptorhinic, with well developed forehead. In studying some of these remains the author found a small proportion of brachycephalic examples. The stature calculated on bone measurements of Paula e Oliveira average about 167 cm., which is undoubtedly higher than that of the Luso-Romans on which we could make similar determination.

The data relative to the period that follows the foundation of the monarchy are very precarious. We only described a feminine skull, supposed to belong to the fourteenth century, dolichocephalic, moderately leptorhinic, having a wide forehead, mesoseme orbits, long face—not differing essentially from the medium contemporary Portuguese type in the greater number of its most important characters. In Portugal few skeletal remains of protohistoric and historic sepulchers and necropolis have been kept and turned to scientific advantage as should be, and in consequence the anthropological evolution of the Portuguese people cannot yet be described with sufficient certainty.

Naturally the data referring to the anthropology of the actual population of the country are more numerous. We shall sum them up in the following chapter.

VII

The Contemporary Portuguese.—Color.—The pigmentation of school children was studied by Eusebio Tamagnini, and his results appeared to show that a smaller predominance of brunets exists in the northern than in the southern provinces, but researches on the subject by Fonseca Cardoso, Gonçalves Lopes, and the author, among adults of Minho, Douro, Beira-Alta and Beira-Baixa, do not quite agree with these conclusions. In Minho the brunet type shows a percentage of 72.7, the blond type only 8.7, the excess of the former being 64 per cent. In Douro the percentage of the dark is 60.2, of the light 11.9, corresponding thus to a difference of 48.3 per cent only in favor of brunets. Tamagnini's data however do not agree with the assumption of a smaller proportion of blond type in Minho than in Douro. In Povia de Varzim, which is in the last mentioned province but joined to Minho, the percentage of brunet types lowers to 45.9 per cent while that of the blond rises to 14.3 per cent. Povia is a seaside town. In Beira Alta the percentage of the brunet type is between those of Minho and Douro, namely 69 per cent, that of blonds 8.9 per cent. Beira Baixa has the greatest brunet proportion, namely 74.5 per cent, as also the smallest number of blonds—7.5 per cent. The color of the skin oscillates between numbers 23, 24, 25 and 26 of Broca's scale. The prevailing color of the hair and eyes is dark brown.

Stature.—The average male stature of 1444 Portuguese, according to Sant' Anna Marques, is about 164.5 cm., that is below medium. The provinces of the lowest averages are Douro (163.4 cm.) and Traz-os-Montes (163.5 cm.), Beira Baixa and Minho being intermediate (164.3 cm. and 164.5 cm.) respectively. Alemtejo and especially Beira Alta are the only ones that exceed the medium height, the former with 165.6 cm. and the latter with 167.4 cm. Statures below medium may be said to dominate generally, and only in Beira Alta do they not reach more than 42.5 per cent, itself a high percentage.

Cephalic Index.—The Portuguese people of today are on the whole the most dolichocephalic people of Europe. On the skull the average index is 74.5 (in Ferraz de Macedo's magnificent series); on the living 76.3 (in that of Sant' Anna Marques). The most dolichocephalic provinces are Beira Alta and Traz-os-Montes (average index on the

living respectively 75.3 and 75.7), the least Minho and Algarve. In the latter the average is 77.5; in the districts of Viana and Braga (Minho) it is respectively 78.0 and 78.7. The proportion of brachycephals in the actual Portuguese population is very small. The cephalic index shows the actual exceptional homogeneity of the people.

Nasal Index.—The average in Ferraz de Macedo's series is 44.4, markedly leptorhinic. Sant' Anna Marques, in 1444 Portuguese men, obtained the average of 65.1 on the living, which is also leptorhinic. The most leptorhinic district is Oporto, with the average index on living of 63.2. The provinces of Beira, Algarve and Traz-os-Montes are the least leptorhinic (the average index ranging from 65.4 to 66.9). The mesorhinic tendency of these provinces is perhaps due, in Beira to a dolichocephalic type with cranio-facial disharmony, and in Traz-os-Montes to possible survivals of a primitive type like the *Homo taganus*. The writer lately made certain studies that suggest this hypothesis.

Orbital Index.—The results of the different investigators differ. Ferraz de Macedo got, on 494 skulls, an average of 82.6, which would show the population to be in the mean microseme. This is thus far the most numerous series of observations on this particular feature.

Facial Index.—Broca's facial index averages 71.9 on Ferraz de Macedo's series, which indicates that the face is relatively long. In the series belonging to the Museum of Coimbra, Barros e Cunha obtained for Kollmann's superior facial index, the average of 54.3—corresponding also to a long face. The same author did not find great differences from one province to another. The writer found in Beira Alta in a very small proportion elements of a disharmonic type, dolichocephalic, mesorhinic and short-faced. This type approaches perhaps some primitive forms (Grimaldi?).

Cranial Capacity.—According to Ferraz de Macedo the average cranial capacity in Portugal is 1573 cc. in men, and 1399 cc. in women. The Beira Alta province gives the greatest mean capacity (1597 cc.); after it comes Minho (1591 cc.), and then Beira Baixa (1507 cc.). The difference in cranial capacity between the "beirão" (inhabitant of Beira) and the "trammontano" (inhabitant of Traz-os-Montes) agrees with the difference in stature, the trammontanos, as we have seen being much shorter people than the beirãos.

Prognathism and other Characteristics.—The alveolar index averages generally 95 in the Portuguese, and the Frankfort facial angle 86.6, according to Ribeiro Gomes, who studied the series of Coimbra Mu-

seum. These numbers correspond to a marked orthognathism. The writer, studying the series of the northern provinces belonging to the Oporto Anthropological Museum, verified the predominance of ovoid (more than 50 per cent) and generally long forms of the vault; he also found a scarcity of sphenoids and pentagonoids (less than 5 per cent), with an absence of spheroids. The ellipsoids were less frequent in women (3.7 per cent) than in men (17.2 per cent). As to the profile, the dominating type in the same series was: Glabella moderately or slightly salient in men, not at all in women; slight supraorbital protrusion, and only in the median parts of the arches; forehead slightly sloping in the males, nearly vertical in the females; metopic curve regular and extending up to the middle of the vault, then coming down gradually without brusque inflection; occiput convex and salient, frequently with a *chignon*; profile frominion to opisthion horizontal or nearly so. The general type corresponds to the Mediterranean; but the Nordic type also appears in some specimens.

Spine and Limbs.—The author made a metric study of some dozens of identified Portuguese skeletons that exist in the Oporto Anthropological Museum, not having as yet, however, completely worked out his observations. The lumbo-vertebral index averages in males 98.7, in females 97.6—which is small, as in other Europeans. More important from the sexual point of view is the conical index, either of the lumbar vertebrae separately, or of the whole lumbar column. As regards the sacral index, the Portuguese (males 113, females 116.2) appear to be one of the most platyhieric peoples, as compared with other Europeans. The innominate index taken on Portuguese skeletons gives an average of 71.3 on the right, 71.1 on the left for men, and of 76.6 on the right with 75.4 on the left for women. For Broca's pelvic index the male average is 133.4, the female 120.3. The brim index is of 87.1 for the males and 90.7 for the females. These results do not differ greatly from the data found in other European series.

In studying the scapula, the author noted interesting sexual differences in the spino-acromial and glenoid cavity indices. In the clavicles the sexual differences are small, except in size.

As regards the bones of the limbs the author has studied rather minutely the humerus, radius, ulna, first metacarpal, femur, patella, tibia, fibula, astragalus, os calcis, scaphoid and the cuboid. For the present he can only give preliminary results with respect to the intermembral, antebrachial, tibio-femoral and humero-femoral indices (see chapter I, comparisons with "kiökkenmöddinger" bones). They

do not differ from the results obtained in other European series. Regarding the femora of the Coimbra and Lisbon collections, Eusebio Tamagnini concludes, from Vieira de Campos's observations, that the Portuguese femur approaches the Baumes-Chaudes type more than the Cro-Magnon, with which some time ago in Portugal ill-grounded comparisons were made.

Types.—The anthropological characters studied on the Portuguese population, permit us to establish the identity of the medium Portuguese type with the Ibero-insular race (*Homo europaeus* var. *mediterraneus*), which certainly descends from the race of Baumes-Chaudes that is represented in the neolithic stations of the country. This type is found purest in remote mountainous regions where natural bulwarks kept it free from admixture. In some places, above all in Minho (in the district of Viana, etc.) in Algarve, a little in Extremadura and in Alemtejo, slight influence of broad-headedness is felt. In general, however, the few actual brachycephals do not present the same forms as the neolithic and preneolithic broadheaded types of Portugal, but are comparable to a variety of *Homo alpinus*, in which a certain tendency to high vault shows itself, as in the brachycephals of the Spanish Extremadura. The percentage of actual brachycephals is very small. In Ferraz de Macedo's craniological series it does not exceed 8 per cent, whereas in Spain it rises to 26.5 per cent and in parts of Italy to 74 per cent; in the same series the proportion of dolichocephals in Portugal is 56.8 per cent. The brachycephalic influence increases on entering Spain both as we near Cape Ortegal, and towards the south as we approach Andaluzia.

The Nordic type, the *Homo europaeus*, blond, tall, dolichocephalic, extremely leptorhinc, left plain traces of its protohistoric and historic invasions in Portuguese territory. Its presence in smaller or greater proportion is most felt in certain northern regions and perhaps especially on the coast.

A semito-phoenician type, tall, brunet, dolicho-mesocephalic, with aquiline nose and triangular face, recognized by Fonseca Cardoso among the fishermen of Povoá de Varzium, and some Semito-Arabian and Berber elements, especially in the south of the country (Alemtejo and Algarve), have also been indicated in the anthropological composition of the population. In Beira Alta it is perhaps the Atlanto-Mediterranean or modified Ibero-insular race, a type of more than medium stature, brunet, dolichocephalic, long-faced, of large cranial capacity and leptorhinc, which dominates the ordinary Ibero-insular.

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A COMPARISON OF THE HANDS OF A PAIR OF POLYDACTYL NEGRO TWINS

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A. INTRODUCTION

The few notes recorded in this paper are presented chiefly because of their interest in connection with the question as to how far the small variations so commonly met with in the dissecting room are really germinal in origin. Data bearing on this question are scanty, since it is generally difficult or impossible to learn anything of the relatives of dissecting room cadavers and since opportunity for the dissection of two individuals known to be related is quite unusual. The chances of obtaining such data from autopsy records might seem to be a little better, but even here they are not good and, moreover, the methods of procedure and the usual restrictions are unfavorable for obtaining information on any but the grosser relations of organs. Apart from characteristics that can be obtained in the living, brain configuration seems to have most often been made the subject of study in comparing the anatomy of near relatives.

In the present instance only the two left hands of a pair of twin infants were available for study. For this material the writer is indebted to Dr. Hans Andersen who performed autopsies on these twins. At the time the hands came into the writer's possession no other parts of the bodies were available, so the account must be based on obstetrical, pathological, and family history records in the Washington University School of Medicine, and upon the subsequent study of the hands themselves.

The above mentioned records show the twins to have been the first children of a pair of moderately dark negroes, each twenty years old. The family relationships are shown in the accompanying pedigree chart (Fig. 1). It is probable that this chart is essentially correct so far as it goes. A few cases of polydactyly and of twins are shown on the father's side. There are probably one or two other polydactyl individuals in collateral branches of the family, but the informants

were not unanimous as to their relationship. The clinical history of the mother shows nothing of special interest.

The children, boys, were born about three weeks prematurely, on June 30, 1918, and both died within a few hours. There were ap-

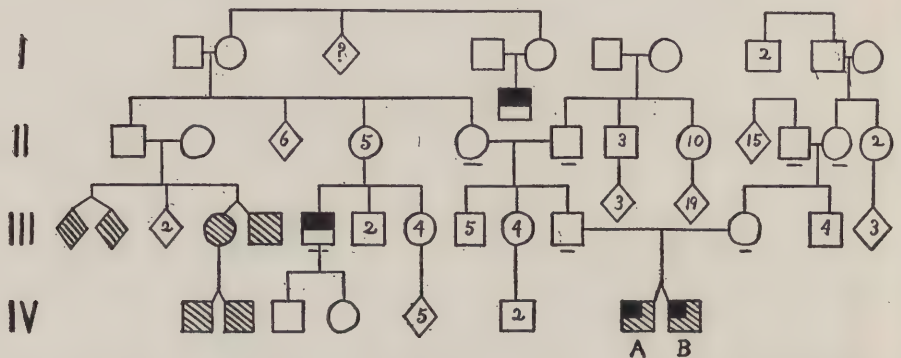


FIG. 1. Condensed pedigree chart. The symbols have their usual significance; those containing numerals stand for the number of individuals indicated. Order of birth in the different families is not shown. Solid black represents polydactyly; cross-hatching, twins. The cases referred to in the text are indicated by the letters A and B. The information upon which the chart is based was supplied by the persons whose symbols are underlined and one of the five women represented by the fourth symbol in generation II.

parently two distinct placentae with a combined weight of $3\frac{1}{2}$ pounds. In the report of the pathologist the diagnosis of prematurity and pulmonary atelectasis is entered. Levaditi stains for Spirochaete were negative. It is stated that in each case the polydactyly was confined to the left hand. The findings on the bodies are recorded as identical throughout except for some differences in weight which are indicated in the subjoined table.

	A	B
Weight of infant.....	1720 grams	1890 grams
" " heart.....	9 "	10 "
" " thymus.....	5 "	5 "
" " lungs.....	42 "	44 "
" " spleen.....	4 "	6 "
" " liver.....	68 "	68 "

Unfortunately the data do not afford conclusive evidence as to whether the twins were uniovular or biovular in origin. The fact that there is some discrepancy between the probable number of uniovular twins as indicated by the presence of one or two placentas,

and the probable number as indicated by the distribution of the sexes leaves the possibility still open that in some cases uniovular twins may be associated with two placentas.

The left hands after removal at autopsy were both placed in the same container without individual labels, so there is also some uncertainty as to which hand belonged to the first and which to the second twin, but since they differed somewhat in size it is assumed that the smaller hand belonged to the smaller twin. This hand is designated as *A*, the other one as *B*. Each of these hands measured 5.5 cm. from the wrist to the tip of the middle finger. The left hand of a normal white infant used as a control, and designated as *C*, measured 6.5 cm. Parallel dissections were made and the three hands compared directly, part by part. Owing to the small size of the specimens some of the work had to be done under a lens. The pencil sketches made as the dissections progressed were put in a finished and somewhat diagrammatic form by Miss Gertrude Hance.

B. THE EXTRA DIGITS

The extra digits were of a type that is not very rare in the white race and, if general impressions may be relied upon, rather common among negroes.¹ The writer has obtained several such fingers that were removed surgically and has also examined a number in living infants and adults. In cases of this type, which represents the most frequent form of polydactyly, the extra digit consists of a subglobose or slightly elongated mass attached by a very slender pedicle to the little finger on the ulnar side of its basal segment. Friction ridges are present on the volar side while the skin on the dorsal side is smooth and free from hair. A small nail is present. In the living subject the

¹ This impression receives some substantiation from two statements by Sir Harry H. Johnston in his "The Negro in the New World" (8vo, N. Y., 1910). On p. 9 he remarks that "Polydactylism (six fingers and six toes) is perhaps commoner among negroes (especially in West and South Africa and in the West Indies) than among the white or yellow peoples"; and again on p. 300, "An interesting point about the Bahama negroes is the relative frequency of polydactylism." Notwithstanding this, a search through the Index Catalogue of the Library of the Surgeon General's office (first and second series) and the first sixteen volumes of the Index Medicus failed to reveal any title relating especially to polydactyly in the negro. This deficiency among the legion of papers relating to the general subject of polydactyly is to be attributed largely to the relatively restricted distribution of the negro, to a lack of care, perhaps, in giving titles to reports, and apparently to a lack of studies on the negro as such.

sense of feeling is good but voluntary motility is generally very slight, if actually present at all.

The supernumerary fingers of the twins conformed to the usual type in gross appearances and relations (Fig. 2). Each contained a cartilag-



FIG. 2. Photograph of the left hands of the twins. (Natural size.) The extra digits attached to the bases of the little fingers are folded over the palms. The hand on the left is the one designated as A, the other is that designated as B.

inous core not attached to the other bones of the hand. Distally beneath the nail ossification had begun. The *Mm. abductor digiti quinti* and *flexor quinti brevis* sent tendon slips into the digits (Fig. 3). The blood supply came from the ulnar proper digital artery of the little finger and was as copious as that to the lateral half of the little finger itself. On the volar side veins followed the artery into the deep palmar system and on the dorsal side into the dorsal rete of the hand. The nerve supply was likewise good. On the volar side there was a common digital nerve for the fifth and accessory digits which bifurcated in the usual way. The extra finger also received another branch from the proper digital nerve to the ulnar side of digit V. On the dorsal surface there was a small cutaneous nerve. These nerves, all branches of the ulnar, are indicated in Figs. 16, 17, 19, 20. Sense organs were well developed, especially lamellar corpuscles which were very numerous. Skin and sweat glands were normal. Sebaceous



FIG. 4.



FIG. 5.

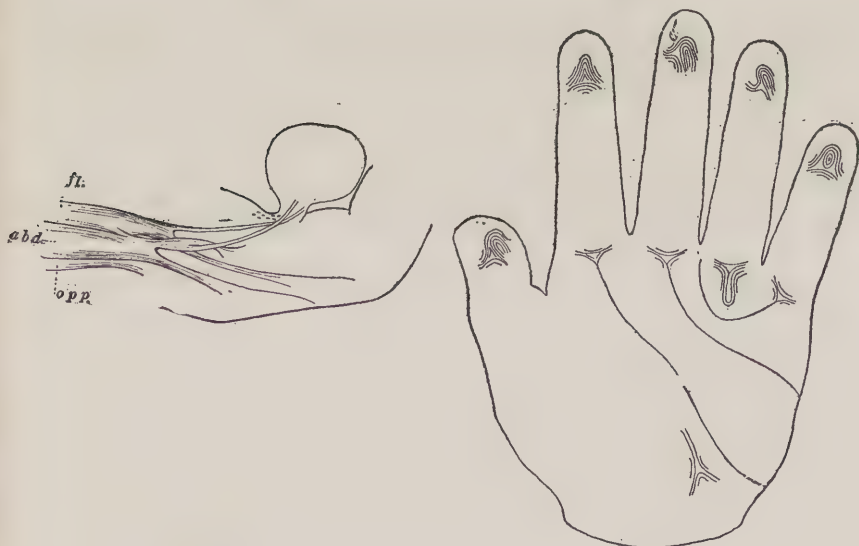


FIG. 3.

FIG. 6.

FIG. 3. Sketch to show the muscles connected with the extra digits. Relations were the same in both *A* and *B*. Abbreviations: abd., *M. abductor digiti quinti*; fl., *M. flexor digiti quinti brevis*; opp., *M. opponens digiti quinti*.

FIG. 4. *A*. Diagram of the configuration of the friction ridges.

FIG. 5. *B*. Diagram of the configuration of the friction ridges.

FIG. 6. *C*. Diagram of the configuration of the friction ridges.

glands were lacking. The extra fingers were essentially the same in both *A* and *B*, although there were some minor differences in the ultimate ramifications of the vessels and nerves. Unfortunately the control hand was not polydactyl.

As to the ontogeny of these extra fingers, not much can be said, but it seems probable that in the earliest stages they are more nearly comparable to the other fingers of the series. The relation of the tendon slips, the blood vessels and nerves suggest this no less than the fact that occasionally an individual appears with a sixth digit fully developed. In the majority of cases, however, the rudiment does not seem to adjust to the developmental processes in the hand and tends to become constricted off. Such a constriction has been shown to take place with the extra digits in polydactyl wings of chick embryos, and with some polydactyl guinea pigs seems to occur spontaneously even after birth. A postnatal constriction of the extra digit probably does not take place spontaneously in man, but the negroes have a practice of eliminating this appendage in the new-born infant by the simple expedient of tying a thread tightly around the delicate pedicle and then allowing the finger to wither and drop off. This method leaves a small persistent wart-like stump which may sometimes be seen in adults.

C. FRICTION RIDGES

The configuration of the friction ridges of the palms is considered to be of considerable morphological significance. In this country, H. H. Wilder, in particular, has given much attention to the subject.

Owing to the cramped condition of the hands it was necessary to remove the skin before these ridges could be satisfactorily studied. It was then found that *A* and *B* showed marked similarity, the palms being identical except for the presence in *A* of a hypothenar pattern which was lacking in *B*. Both showed the presence of a thenar pattern. In general the picture conformed to what Wilder has called the negro type, the formula being 7-5-5-2 in each case. Some differences in the arrangement of ridges on the fingers are indicated in the diagrams.¹ In *C* the palm was quite different. There was no thenar or hypothenar pattern and the formula was 9-7-5-3.

As a rough indication of the degree of resemblance between the

¹ The skins from the palms of *A* and *B* were turned over to Professor Wilder who states that they "are *duplicates* in spite of the loss of the hypothenar pattern on one hand."

hands, critical features shown in the three diagrams were compared. Such a comparison reveals nine points (exclusive of those associate with the extra digits) in which the three hands are not all in agreement. *A* and *B* resemble each other and differ from *C* in six of these particulars. *A* resembles *C* and differs from *B* in two. *B* and *C* resemble each other and differ from *A* in one. Such a comparison under-rather than over-emphasizes the similarity between the twin hands, since the points in which they agree are such as are considered more significant than those in which they differ. A study of the finer details of the patterns was not attempted.

D. SKELETAL ELEMENTS

The proximal row of carpal cartilages was largely destroyed in both *A* and *B* when the hands were removed. The distal row of carpals, the metacarpals and the phalanges were left intact and on dissection seemed to be entirely normal, suggesting that the influence of the extra digit did not extend to the bones of the carpus or metacarpus. In the accessory finger there was, as already mentioned, a short rod of cartilage slightly ossified at the end beneath the nail. It was unrelated to other parts of the skeleton. In *C* the skeletal parts of the hand were likewise normal. The skeletal system, therefore, presented no variations that could be of use for comparison between the twins and the control.

E. MUSCLES

(a) *Long Muscles*.—In this group only the distal tendinous parts of the muscles were available for study. Of these the flexors and extensors of the wrist showed nothing of especial interest except that in *C* the *Mm. extensores carpi radiales* presented three tendons all inclosed in a single sheath. This is not an uncommon variation. In *A* and *B* the two usual tendons only were present and each of these was inclosed in its individual sheath.

The extensors of the thumb and of the fifth finger were alike in all three cases. The synovial sheaths of these tendons were also similar. In each case the tendon of the *extensor digiti quinti proprius* bifurcated within the sheath which sent a separate prolongation along each resulting slip, that part of the sheath on the ulnar side being longest.

The *extensor digitorum communis* tendons presented only slight irregularities. Two of these tendons in each case anastomosed in the space between metacarpals 3 and 4. While the anastomoses were

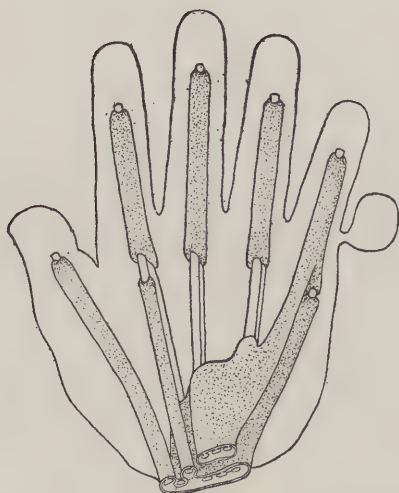


FIG. 7.

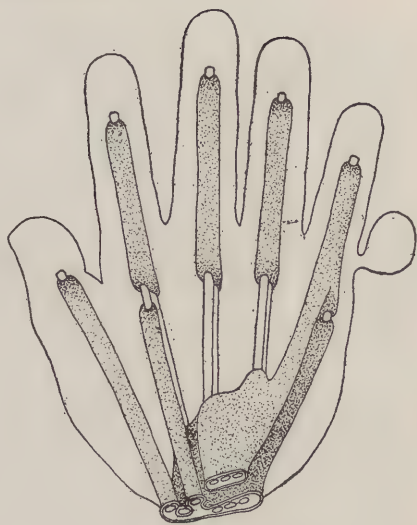


FIG. 8.

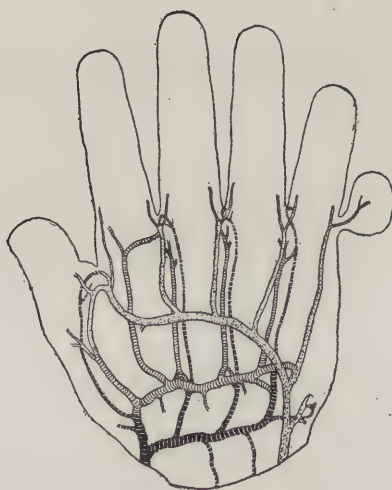


FIG. 10.

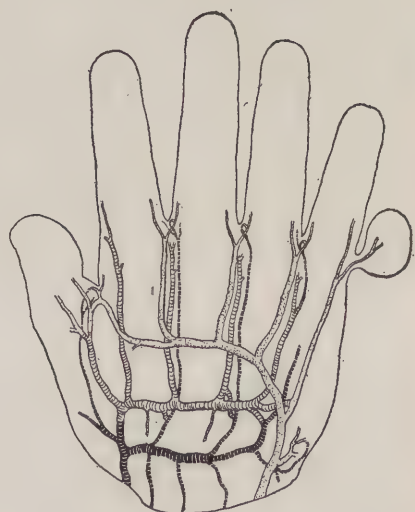


FIG. 11.

FIG. 7. A. Synovial sheaths of the flexor tendons.

FIG. 8. B. Synovial sheaths of the flexor tendons.

FIG. 10. A. The principal arteries of the hand. The superficial volar arch and its branches are stippled, the deep volar arch and its branches are white crossed by black lines, and the dorsal arteries of the hand are black crossed by white lines.

FIG. 11. B. The arteries of the hand indicated as in Fig. 10.

essentially the same, the difference was greater between *A* and *B* than between *B* and *C*. One other variation was noted: the presence in *B* of a thread-like accessory slip which became lost in the aponeurotic bridge between the tendons to digits 3 and 4. This was lacking in *A* and *C*.

Except for its investment, the tendon of the *M. extensor indicis proprius* was the same in all three hands.

The synovial sheaths of the extensor communis and extensor indicis proprius tendons were disposed in identical fashion in *A* and *B*, but rather differently in *C*. In the twins the sheath of the indicis proprius was not connected with that of the communis tendons and, moreover, the communis tendon to the index finger was in a compartment nearly free from the rest. In *C*, on the other hand, not only was there little indication of a separation between the sheaths of the communis tendons but the extensor indicis proprius was also included in the common sheath. The condition found in *C* is apparently the normal (*i.e.*, most frequent) one, which makes more striking the identity in *A* and *B*.

The flexor tendons to the digits were essentially the same in all three cases except that the profundus tendons were less closely aggregated (separated at a higher level) in *A* and *B* than in *C*. The synovial sheaths about the tendons presented interesting differences. Here, as on the dorsal sides of the hands, *A* and *B* were essentially identical while *C* differed from them rather markedly. In none of them was a true vagina tendinum *Mm. flexorum communis* present within the region available for dissection, the sheaths of sublimis and profundus tendons being essentially distinct. It is possible that the arrangements found in all three cases represent infantile conditions which would have been altered in the course of subsequent development, but in any event it is clear that two very different arrangements were represented and that *A* and *B* conformed closely to one type.

In *A* and *B* (Figs. 7 and 8) the three ulnar tendons of the flexor digitorum sublimis pass through a rather loose common sheath which shows only a slight tendency to conform to the individual tendons, except the one to the little finger which is surrounded by a projection of the sheath that reaches to and communicates with the digital sheath which, in all the fingers, surrounds the distal region of both sublimis and profundus tendons. This is essentially the arrangement frequently shown in atlases of anatomy except that the figures commonly do not differentiate between the sheaths of sublimis and profundus

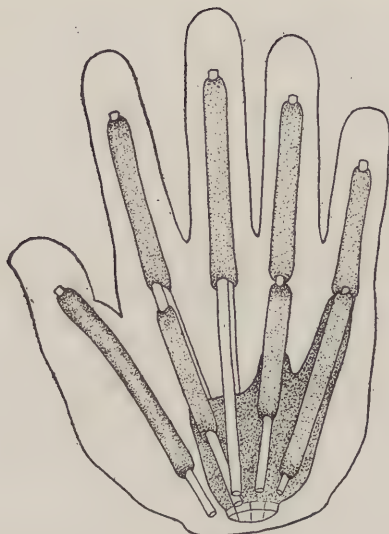


FIG. 9.

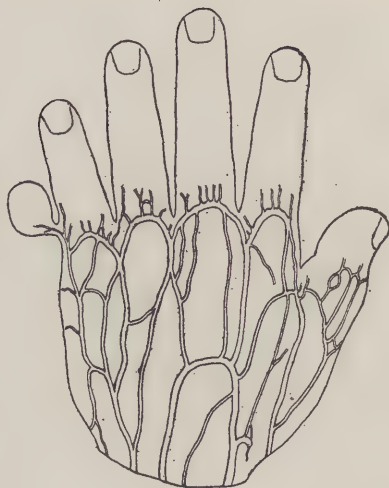


FIG. 13.

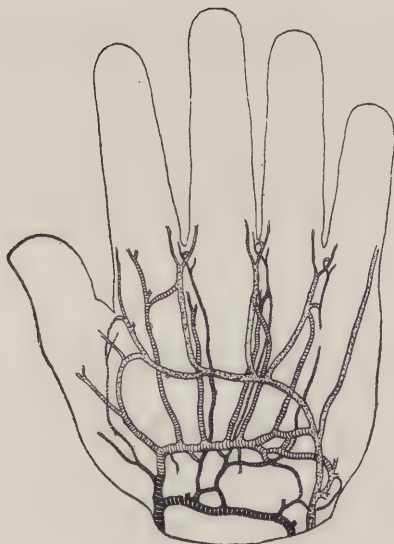


FIG. 12.

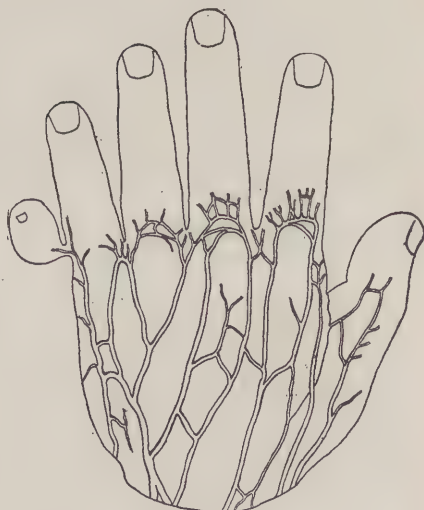


FIG. 14.

- FIG. 9. *C.* Synovial sheaths of the flexor tendons.
 FIG. 12. *C.* The arteries of the hand indicated as in Fig. 10.
 FIG. 13. *A.* Superficial veins of the dorsum of the hand.
 FIG. 14. *B.* Superficial veins of the dorsum of the hand.

tendons. Here they were quite distinct although they are separated laterally by a rather thin septum which would possibly have become obliterated later in life. The sublimis tendon to the index finger was surrounded by a sheath which seemed to communicate proximally with that of the profundus tendons, but since the point of apparent union of these two sacs was very close to the cut edge of the wrist the possibility that the connection was made artificially can not be excluded. The same situation existed with reference to this sheath and that of the flexor pollicis longus, the position of possible septa being indicated in the figures by dotted lines. Distally the sheath around the tendon to the index finger extended through the palm nearly to the beginning of the digital synovial sheath. The three ulnar tendons of the *M. flexor digitorum profundus* were surrounded by an even more capacious synovial sheath (Figs. 7 and 8) than those of the *M. flexor digitorum sublimis*, but there were no projections from this sac that communicated with the digital synovial sheaths, although the one on the ulnar side came so near to it that the intervening septum would almost certainly have been destroyed had an attempt been made to inject the sheaths. The profundus tendon to the index finger had no synovial sheath at all in the proximal part of the hand.

In *C* (Fig. 9) the flexor pollicis longus and the flexor digitorum sublimis tendons to digits 2, 4 and 5 had individual sheaths which began and ended within the hand. The sublimis tendon to the middle finger did not have a sheath before it entered the digital sheath common to it and the corresponding profundus tendon. The four tendons of the profundus muscle had a large common sheath which sent a long projection up toward the little finger. This projection, however, did not actually communicate with the sheath in the finger, although a little pressure from an injection mass might easily have made it seem to do so. It is not improbable that an actual connection would have been established later in life.

(b) *Short Muscles*.—The muscles in this group could be examined in their entirety and were consequently much more favorable for comparison.

The *M. palmaris brevis* was essentially the same in all, though possibly somewhat more fleshy in *A* and *B*. It did not seem to be directly influenced by the presence of the extra digit.

The muscles of the little finger were alike in *A* and *B* (Fig. 3). The abductor tendon immediately bifurcated, the dorsal slip having the usual insertion of an abductor tendon, while the more slender

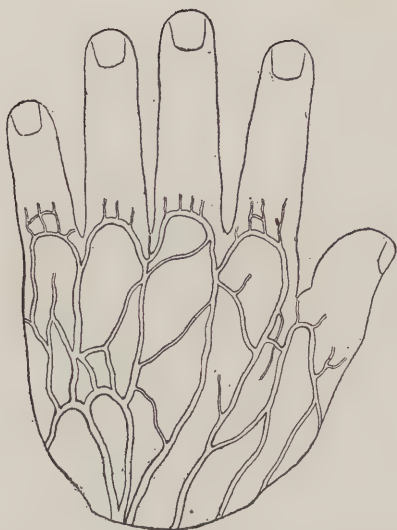


FIG. 15.

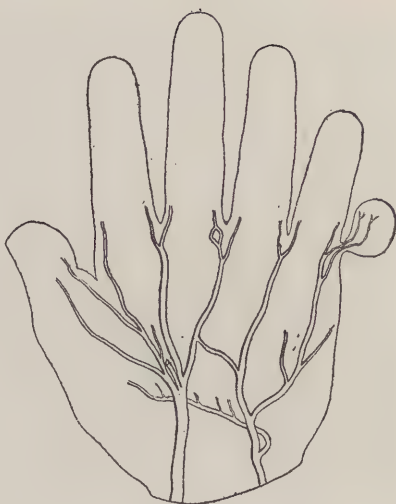


FIG. 16.

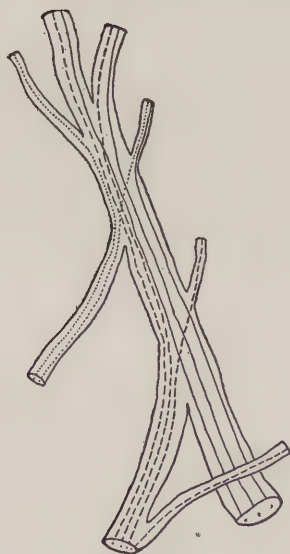


FIG. 19a.

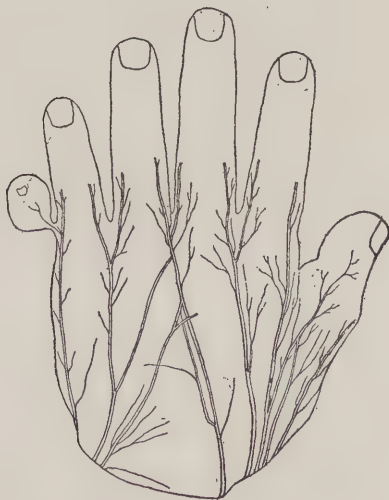


FIG. 19.

- FIG. 15. C. Superficial veins of the dorsum of the hand.
 FIG. 16. A. The principal nerves on the volar side of the hand.
 FIG. 19. A. Superficial nerves of the dorsum of the hand.
 FIG. 19a. A. Analysis of the plexus shown in Fig. 19 and formed by branches of the radial and ulnar nerves.

ventral slip was prolonged into the accessory digit. The tendon of the flexor brevis behaved in the same manner. The bellies of these two muscles were connected by a slip of fibers which separated from the ulnar side of the flexor and joined the adjacent part of the abductor. Otherwise these and the opponens were normal. In *C* the three short muscles of the little finger conformed to the usual condition. They were easily separable and not connected by muscular slips.

The muscles of the thenar region in *A*, *B* and *C* were essentially alike as regards the abductor pollicis brevis, opponens and both heads of the flexor pollicis brevis. In *A* and *B*, however, the superficial head of the flexor brevis and the opponens were more or less confluent and in all three the deep head of the flexor pollicis brevis seemed to be remarkably slender—possibly an infantile condition. The adductor pollicis presented more points of differences. In *A* the transverse head of the muscle was broader than usual and in addition received a triangular accession of fibers arising from the os capitatum. This might be regarded as a slip from the oblique to the transverse head of the muscle. In *B* and *C* the transverse heads were similar and normal. The oblique head of the adductor was found in *A* to be divided proximally in two parts, the fibers from the capitatum and those from the third metatarsal being separated by the deep volar arterial arch which passed between them. This part of the muscle was somewhat confluent with the first volar interosseus. The oblique head in *B* was identical with that in *A* except that it was not united to the first volar interosseus. In *C* the oblique head was normal, free from the first volar interosseus and not penetrated by the deep palmar arch.

The lumbrical muscles were similar in all three hands except that in *A* the first was nearly three times as large as the second and in *B* it was fully three times as large. In *C* it was less than twice as large.

The eight interossei muscles were dissected in each hand and the dissections carefully compared. The comparison failed to reveal any describable differences except that in *A* and *B* the fibers of the second volar interosseus arose in more intimate connection with those of the transverse head of the adductor pollicis than did those of *C*.

Summarizing the variation, found in the muscles and tendons, it appears that *A* and *B* showed departures from the assumed normal of the same nature and of about the same degree with respect to the sheaths of both extensor and flexor tendons, the tendons and intermuscular slip of the abductor and short flexor of the little finger, the

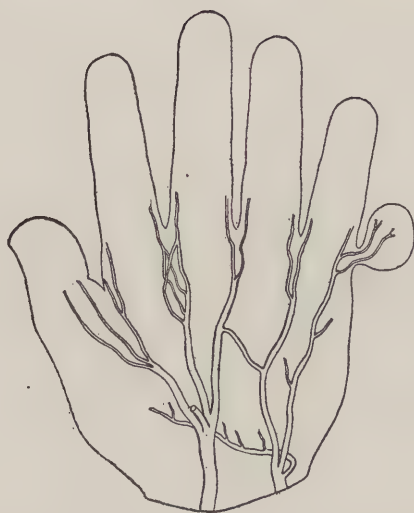


FIG. 17.

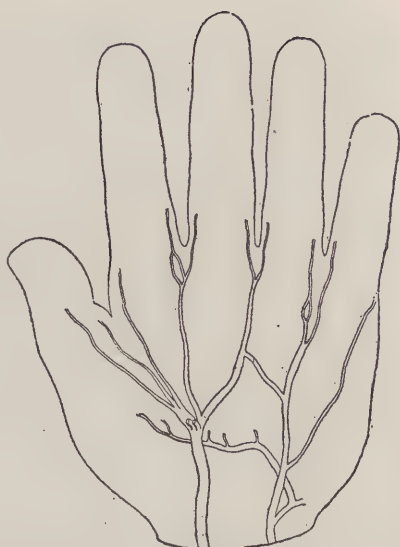


FIG. 18.

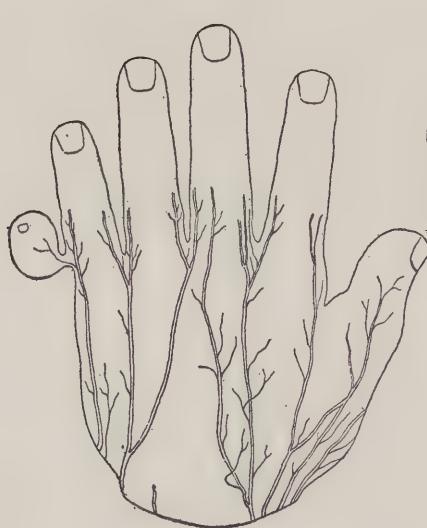


FIG. 20.

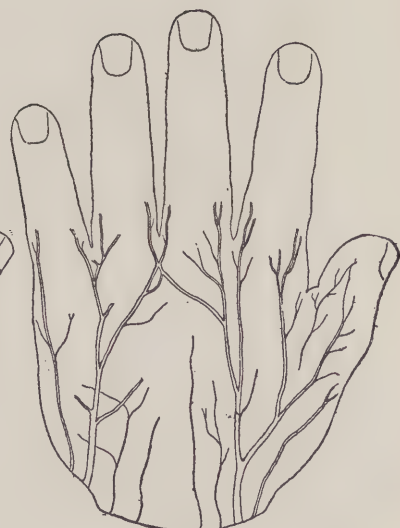


FIG. 21.

FIG. 17. *B.* The principal nerves on the volar side of the hand.

FIG. 18. *C.* The principal nerves on the volar side of the hand.

FIG. 20. *B.* Superficial nerves of the dorsum of the hand.

FIG. 21. *C.* Superficial nerves of the dorsum of the hand.

origin of the oblique head of the adductor pollicis, in the first lumbrical muscle, and, to a less degree, in the origin of the second dorsal interosseus. They differed from each other slightly in the relations of extensor communis tendons and more markedly in the origin of the transverse head of the adductor pollicis. Counting all the variations noted (exclusive of those involving the sixth digit), *A* and *B* were found to agree with each other and differ from *C* with respect to fourteen points while *A* and *C* were alike and different from *B* in one point and *B* and *C* like each other and different from *A* in two points. Of course these variations do not all have the same value, but it would be almost impossible to weigh them according to their importance.

F. BLOOD VESSELS

(a) *Arteries*.—The arterial arches of the hand and their main branches were dissected in each of the three cases. The relations of these vessels are shown diagrammatically in Figs. 10, 11 and 12. Several departures from the condition ordinarily found in the adult may be noticed in all of the hands. Some of these are possibly infantile conditions. The most noticeable is the termination of the superficial volar arch which ended in an anastomosis with the lateral branch of the *A. princeps pollicis*. Immediately before making this anastomosis, branches were given off which in *A* and *C* largely replaced the *A. radialis indicis* and in all three formed a superficial anastomosis with the first dorsal metacarpal. In none could a superficial volar branch of the radial be found. A vessel in position for it came off from the superficial volar arch and was lost in the thenar musculature.

For purposes of description, the superficial volar arch, the deep volar arch and the dorsal carpal rete may be considered separately.

1. *Superficial Volar Arch*.—The main arch was the same in both *A* and *B*. The common digital branches were also alike in origin and course except that the most ulnar of these branched at an acute angle in *B* and at nearly a right angle in *A* to supply a vessel to the sixth digit. In *C* the superficial volar arch and common digital arteries were the same as in *A* and *B* except that (1) in the absence of a supernumerary digit the common digital to the ulnar side of the little finger did not branch, (2) the common digital to the third interspace gave off a communicating branch to the corresponding dorsal metacarpal, and (3) the common digitals to the third and fourth interspaces arose near together instead of widely separated as in *A* and *B*. In this last respect *C* resembled the usual type. In *A* and *B* the first common digital was ulnar to the nerve, in *C* it was radial.

2. *Deep Volar Arch.*—The deep volar arch presented more variations than did the superficial. Beginning in the usual place it traversed the palm in the usual manner and terminated in *A* and *B* by anastomosing with the fifth common digital. It was in no way connected with the deep volar branch of the ulnar. In *C*, on the other hand, there was the normal connection with the deep volar branch of the ulnar and also an anastomotic branch to the superficial volar arch. The relation of the deep volar arches to the oblique heads of the *M. adductor pollicis* has already been mentioned.

The usual three perforating branches were present. In *A* the first and second arose from the corresponding metacarpal arteries, the third directly from the arch; in *B* the first and third arose directly from the arch, the second from the metacarpal; in *C* they were normal, all arising directly from the arch.

The *A. radialis indicis* in *A* bifurcated over the head of the second metacarpal bone, the larger part of the vessel terminating by an anastomosis with the common digital artery between the second and third digits. In this respect it somewhat resembled a normal volar metacarpal except that the anastomosing vessels came from the two sides of the bone and not from the interspace. The more radial branch of the artery was small and, as already stated, was largely replaced by a branch from the superficial arch. In *B* there was no anastomosis, the *A. radialis indicis* having the relations commonly described as normal. In *C* the arteries of the index finger were in all respects essentially as in *A*, suggesting that an anastomosis of the *A. radialis indicis* with the first common digital results in a reciprocal enlargement of the branch of the superficial arch to the index.

The volar metacarpal arteries were alike in *A* and *B*, but in neither case could they be found to anastomose with the common digitals, being distributed, except for perforating branches, entirely to muscles and bones. In *C* the first failed to make the normal terminal anastomosis (which was replaced largely by that of the *A. radialis indicis*), the second was double, one part running into the common digital, the other furnishing the perforating branch, while the third was essentially normal except that the perforating branch was in reality given off from the common digital instead of from the volar metacarpal artery.

3. *Rete Carpi Dorsale.*—There is a transverse arterial channel on the back of the hand which communicates with the radial artery on one side and the ulnar on the other. This amounts to a dorsal arch

and from it the second, third and fourth dorsal metacarpal arteries are given off. These three arteries were similar in *A* and *B* except that the third one was interrupted in *B*. It was very slender in *A*. Only the third communicated with the volar metacarpals, but all communicated with the volar digitals. In *C* the third dorsal metacarpal was interrupted, the distal part being in reality a branch of the third common digital. The first and second communicated in normal manner with the corresponding volar metacarpals. Each of them communicated with the proper digital on the radial side of their respective digits.

Summarizing the observations on the arteries, it was found that *A* and *B* resembled each other and differed from *C* in eleven points, that *A* and *C* resembled each other and differed from *B* in two points, and that *B* and *C* resembled each other and differed from *A* in three points.

(b) *Veins*.—The deep veins accompanying the main arteries were not studied in detail. So far as observed they presented no features of especial interest. The superficial veins of the dorsum of the hand, however, were carefully dissected and their relations are sketched in Figs. 13, 14 and 15. Through deep anastomoses the dorsal network communicated with the venae comitantes of the arteries, but these anastomoses are not shown in the sketches. While it might be possible, if the relative size of vessels were disregarded, to make a single diagram that would fit both *A* and *B*, it is not really apparent from the dissections or drawings that *A* and *B* resemble each other more or less than they resemble *C*. In other words, the degree of resemblance found in most of the other systems was not apparent in the veins of the dorsum of the hand.

G. NERVES

(a) *Nerves of the Palm*.—The nerves of the palm (Figs. 16, 17 and 18) presented few variations of importance. In *A* the anastomotic branch from the ulnar to the median nerve carried fibers none of which reached the middle finger. In the other two cases the decussation of fibers was so complicated that their ultimate distribution could not be determined. The nerve supply to the accessory digit in *A* and *B* has already been described. The common digitals showed only very minor variations chiefly in the extent to which they formed loops around the common digital arteries. The first common digital was longer in *A* and *B* than in *C*. The second, third and fourth divided low in *A*, the third low in *C*.

The deep palmar branch of the ulnar passed ventral to the deep volar arch in *A*, dorsal to it in *B* and through it in *C*. With reference to the *A. radialis indicis* the nerve was ventral in *A* and *C*, dorsal in *B*.

(b) *Nerves of the Dorsum of the Hand*.—The nerves of the back of the hands are shown in Figs. 19, 20 and 21. A detailed description of these nerves does not seem warranted. In *A* and *B* the branches of the radial nerve reached the third interspace, a condition found according to Stopford in about 50 per cent of cases. In *A* the radial fibers reached the lateral side of the fourth digit (Fig. 19, *a*), in *B* they probably did not do so. The nerves to the thumb were the same in arrangement but differ in size. Anastomoses between the radial and ulnar were extensive in *A*, apparently lacking in *B*. The distribution of the ulnar was apparently the same in all three cases except that in *A* twigs from this nerve ran into a triangular space in the middle of the dorsum. In *B* this space was mostly unaccounted for and in *C* it was supplied by terminal branches of the dorsal antibrachial cutaneous (Stopford).

Summarizing: *A* and *B* were found to resemble each other and differ from the other hand in four points, *A* and *C* in two points, and *B* and *C* in one.

H. SUMMARY

An incomplete dissection was made of the left hands of a pair of polydactyl negro twin infants, which were possibly uniovular in origin. The left hand of a normal white infant was used as a control. In several respects the three infants showed like departures from what is generally considered as the normal adult condition. This suggests that there may regularly be a considerable amount of change in these parts between the time of birth and maturity and emphasizes the fact that birth is only an incident in ontogenetic development.

The extra digits were found to present the elements of a normal finger in a shortened and more or less abortive condition. It is suggested that polydactyly of the type represented by these cases probably has its cause and, relatively fullest expression, at an early period of ontogeny. The condition may probably be induced by either hereditary or other factors.

Finally, a comparison of the two polydactyl hands with the control showed that the twins displayed a marked similarity in respect to the friction ridges, the muscular and the arterial systems, some similarity in the distribution of nerves, and practically no resemblance

in regard to the veins. Of the forty-nine points in which one or another of the three hands differed from the other two, the twins were alike in thirty-five points, while each twin differed from the other twin and agreed with the control in seven different points. These comparisons are based on structures not directly associated with, or obviously modified by the extra digits. Nevertheless, if it be true that such digits are in earlier stages of relatively greater morphological importance, it is possible that their indirect effects may persist in various parts of the hand. Other, but probably not many, of the differences between the twins and the control may have been due to racial factors. If to cover all these factors we were to deduct an arbitrary 50 per cent, which is doubtless much too high, the twins would still resemble each other two and a half times as much as either one resembled the control. It would therefore seem that heredity is probably the principal factor involved in the variations of most of the systems studied in these dissections.

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SOME RACIAL CHARACTERISTICS OF THE LIVER WEIGHT IN MAN

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This is the second of a series of studies on the weights of the internal organs in men of different races (1). The livers of 1,359 white men, 1,377 negro men, 420 white women, and 559 negro women are utilized in the present study. The weights of all the livers, normal and abnormal, will be given first, and then an attempt will be made to select only normal organs.

TOTAL LIVER WEIGHT

Race and Sex	Below 1200 Grams	1200 to 1800 Grams	Above 1800 Grams
	Per cent	Per cent	Per cent
White male	8.7	52.6	38.7
Negro male	11.0	57.1	31.9
White female	19.8	58.0	22.2
Negro female	22.8	61.6	15.6

It is evident that the white livers are larger than the negro and the male larger than the female. The racial difference is a little greater in the females than in the males.

The liver weight was examined in certain diseases in the same manner as for the total liver weight. The following diseases were taken separately: tuberculosis, syphilis, carcinoma, cirrhosis of the liver, chronic nephritis and carditis, acute lobar pneumonia, typhoid fever and malaria, then the remainder of the livers were put in a separate group. In each of these groups the same race and sex differences were found as in the total liver weight, and the racial differences were slightly greater in the female than in the male.

The livers in those who died of acute infectious diseases other than pneumonia, typhoid fever and malaria, are practically if not absolutely normal, and these livers are given in a separate table, if the liver in each individual is otherwise normal.

LIVER WEIGHT IN ACUTE INFECTIONS

Race and Sex	Number of Specimens	Below 1200 Grams	1200 to 1800 Grams	Above 1800 Grams
	Per cent	Per cent	Per cent	Per cent
White male	173	3.5	50.3	46.2
Negro male	133	8.3	60.9	30.8
White female	85	9.4	61.2	29.4
Negro female	103	17.5	59.2	23.3

This is further evidence that the white livers are larger than the negro and the male larger than the female, and that the racial difference is greater in the female than in the male.

THE NORMAL LIVER WEIGHT

After this had been done an attempt to determine the true normal liver weight was undertaken. Every accident case or record of sudden death was scrutinized carefully and only those were selected as normal where no infection supervened, and where no record was given of any pathological condition involving the liver. Only 41 livers of white men, 46 of negro men, 12 of white women and 4 of negro women were found that seemed to be normal. A list of these is given with the available data and the relation of liver weight to stature. No liver weights are included where the persons were below the age of 22 years. A table of the normal liver weight follows:

NORMAL LIVER WEIGHT

Race and Sex	Below 1200 Grams	1200 to 1600 Grams	1600 to 2000 Grams	Above 2000 Grams
	Per cent	Per cent	Per cent	Per cent
White male	7.3	36.6	41.2	14.6
Negro male	13.3	66.7	15.6	4.4
White female	33.3	41.7	16.7	8.3
Negro female	40.0	60.0	16.7	8.3

The livers of the white men are grouped about 1600 grams and those of the negro men about 1400 grams. The liver weights of the women are few for conclusion, but they are smaller than those of the men, as is to be expected.

The average liver weight of the white men in this group is 1664 grams, that of the white women 1407 grams, that of the negro men 1443 grams, and that of the negro women 1201 grams. The extreme liver weights of the white men are, respectively, 1100 and 2600 grams, of the negro men 980 and 2270 grams, of the white women 1100 and 2030 grams, and of the negro women 850 and 1560 grams.

The racial difference of the weight of the liver in relation to stature was found to be more marked than the actual liver weight and is given as follows:

$$\text{RATIO OF LIVER WEIGHT TO STATURE } \left(\frac{\text{Liv.} \times 1000}{S} \right)$$

Race and Sex	Ratio-Factor Below 800	Ratio-Factor 800 to 1000	Ratio-Factor 1000 to 1200	Ratio-Factor Above 1200
	Per cent	Per cent	Per cent	Per cent
White male.....	25.6	28.2	30.8	15.4
Negro male.....	31.8	59.1	6.8	2.3
White female.....	30.0	50.0	10.0	10.0
Negro female.....	50.0	25.0	25.0	—

The average ratio of the white male is 974, of the white female 937, of the negro male 859, and of the negro female 733 grams of liver weight per 100 centimeters of stature. The sexual difference is not great for the white, therefore the liver weight varies more by stature than by sex. This cannot be said of the negro, although the number of ratios (4) for the negro female is too small for comparison. Practically all the individuals were well nourished; therefore the condition of nourishment can have little or nothing to do with the difference in liver weight.

DISCUSSION

A much larger number of persons were young, tall and well nourished among the negroes than among the whites, and it is known that the liver is larger in these three conditions than in the small, old, thin persons. The weight of the liver in the negroes here represented should be greater than among the whites. The reverse is true, therefore this emphasizes the racial difference. The above is true for the total liver weight and also for the normal liver weight.

The records of the negroes are chiefly of the submerged tenth, especially those from the Charity Hospital, and the records of the whites are from a somewhat higher class in society, especially those from the Johns Hopkins Hospital. Whether this makes any difference in the weight of the liver remains to be determined. Whatever difference it might make would probably be largely outweighed by the factors of age, stature and condition of nourishment that have already been mentioned.

The liver in pregnant women is considerably larger than the average of the normal liver weight. It would be of interest to determine whether the liver in laboring men is larger than in men of leisure.

There are a multitude of factors that may enter into the liver weight, such as the amount and character of food and drink, the habits of the individual, and the morphological type of the individual, without a knowledge of which it would be difficult to say what is strictly normal and what not. It would also be futile to determine the weight of the normal liver from published records because so many abnormal livers are included in them.

Greenwood (4) gives the weight of the human adult liver in the general hospital population of London as 1786 grams, and of "healthy" men selected from this population as 1713 grams, which is larger than we found for the white male, but is probably about correct. Vierordt (7) gives the mean weight of 60 livers of white males at the age of 24-25 years as 1829 grams, and this may possibly be the normal weight for the liver of the Germans. Mayo Brothers (5) of Rochester, Minnesota, give the normal liver weight without relation to sex at from 1400 to 1600 grams, and the text books of anatomy give the normal liver weight for the male anywhere from 1400 to 1750 grams, and for the female from 1200 to 1400 grams. Most of these weights of the male are higher than for the white male of our series. The only reference we have found to the weight of the liver in other races is that of Castor (3) on East Indians and African blacks. His data are as follows: India males 1219, females 1033; Bengal (2) males 1276, females 1063; Burma males 1305, females 1162; African males 1474, females 1304 grams. The liver of these peoples seems to be smaller than that of the Europeans. Miller (6), on the other hand, gives the liver weight of the male as 1500 grams and that of the female as 1300 grams, while the liver of the senile averaged only 850 grams.

CONCLUSIONS

The liver of the negro is smaller than that of the white, and this is well marked in both normal and pathological specimens.

The white male liver may be said to weigh on the average about 1650 grams, the negro male 1450 grams, the white female 1400 grams, and the negro female 1200 grams; but the number of normal livers is too few to justify these figures as wholly final.

The racial difference is considerable in spite of the fact that more tall, young, well nourished negroes and more small, old, thin whites constitute the records.

DETAILED DATA ON THE WEIGHT OF THE LIVER IN INDIVIDUALS IN WHOM THE
ORGANS MIGHT BE CONSIDERED NORMAL.

WHITE MALE

Johns Hopkins Hospital

No.	Age	State of Nourishment	Stature, Cm.	Liver Weight, Gm.	Ratio of Liver Weight to Stature	Causes of Death
1152	.....	good	.....	1770	.....	Gunshot wound in head; hemorrhage.
1223	35	.....	142	1370	965	Bronchitis; congestion of stomach.
2485	27	good	174	1720	989	Traumatic cerebral hemorrhage.
2656	44	good	162	1720	1062	Fractured skull, ribs and shoulder; hemorrhage; chronic endocarditis.
2563	55	good	180	2250	1250	Fractured skull; hemorrhage; chronic nephritis; arterial sclerosis.
2701	32	thin	168	1500	893	Trauma; hemorrhage of brain; craniotomy.
3369	25	good	170	1750	1029	Trauma; cerebral hemorrhage; craniotomy.
3480	39	good	170	1340	788	Traumatic cerebral hemorrhage.
4447	55	good	183	2250	1230	Trauma of leg; fat embolism.
4647	50	good	176	1765	1003	Potassium cyanide poisoning; necrosis of the stomach.
4769	33	thin	166	1780	1072	Lacerations of thigh; operation.
5189	38	good	162	2200	1358	Electric shock.

Charity Hospital, New Orleans, La.

'14-190	36	good	160	1510	944	Post-operative hemorrhage; ruptured aneurism of aorta.
-305	50	good	170	1210	712	Phenol poisoning; chronic nephritis; arterial sclerosis.
'16-155	51	good	165	1200	721	Mercuric chloride poisoning; hemorrhage of intestine; ac. and chr. nephritis; arterial sclerosis.
'17-236	25	good	177	1400	791	Concussion of the brain.
2107	65	good	178	1758	987	Cerebral hemorrhage.
2138	.....	good	.....	2381	.....	Acute congestion of the kidneys; myocarditis; fatty liver.

Touro Infirmary, New Orleans, La.

'9-48	60	thin	172	1500	872	Cerebral embolism; atheroma of aorta; slight arterial sclerosis.
'10-13	40	thin	185	1900	1027	Fractured skull.

NEGRO MALE

Johns Hopkins Hospital

1413	35	.....	180	1450	806	Fractured skull; amputation of legs.
1625	43	good	155	1350	871	Burns; edema of lungs.
1735	52	good	167	1550	928	Tetanus; ecchymosis of pleura and gastric mucosa; congestion of viscera.
1802	43	good	151	1650	1093	Cerebral hemorrhage.
2911	40	good	157	1500	956	Trauma; congestion of kidney; cystitis.

NEGRO MALE—*Continued**Johns Hopkins Hospital*

No.	Age	State of Nourishment	Stature, Cm.	Liver Weight, Gm.	Ratio of Liver Weight to Stature	Causes of Death
3418	56	good	175	2270	1297	Fracture 6-7 vertebra: pressure on spinal cord.
4630	32	good	160	1200	750	Acute cocaine poisoning.

Charity Hospital

'14-126	26	good	180	1400	778	Rupture of aortic aneurism into esophagus.
-228	38	good	.....	1150	.....	Gunshot wounds of abdomen, thorax, thigh, face; hemorrhage; acute nephritis; chronic splenitis.
-237	22	good	170	1450	864	Fractured skull; hemorrhage; acute and chronic nephritis; chronic splenitis.
-281	34	good	175	1650	943	Gunshot wound of sacrum; 9 perforations of peritoneum; chronic nephritis.
-408	36	thin	170	1580	930	Rupture of aortic aneurism into pleura and esophagus; chronic nephritis.
-424	43	good	172	1680	977	Fractured skull; cerebral hemorrhage; acute and chronic splenitis.
'15-148	30	good	166	980	590	Gunshot wound of abdomen; perforation of intestine; hemorrhage.
-331	27	good	170	1200	706	Fractured pelvis; ruptured bladder; hemorrhage; shock; concussion of brain; chronic nephritis.
-457	71	good	165	1400	849	Acute dilatation of the heart; edema of lungs; slight passive congestion of liver; chronic nephritis and splenitis.
'16-90	37	good	176	1400	794	Fractured skull; cerebral hemorrhage; fractured clavicle; contusion and laceration of face; pachymeningitis.
-292	24	good	160	1450	906	Gunshot wound of abdomen; perforation of both lungs and liver; hemorrhage and shock.
'17-39	80	good	160	1390	869	Fractured skull; cerebral hemorrhage.
-158	30	good	180	1130	628	No cause found; congestion of spinal cord.
-201	60	good	170	1600	941	Intestinal obstruction; chronic nephritis and splenitis; cardiac hypertrophy; fatty liver.
-244	52	good	174	1400	805	Ruptured aneurism of the descending aorta.
-247	46	good	173	1250	723	Ruptured aneurism of the aortic arch.
-264	39	thin	176	1500	852	Ruptured aneurism of the aorta into trachea.
'18-76	34	good	175	1260	720	Ruptured aneurism of the aorta into lesser sac.
2622	34	thin	165	1077	653	Volvulus; subacute parenchymatous nephritis; chronic myocarditis.

NEGRO FEMALE

Charity Hospital

No.	Age	State of Nourishment	Stature, Cm.	Liver Weight, Gm.	Ratio of Liver Weight to Stature	Causes of Death
'16-12	55	thin	164	1400	854	Shock; acute traumatic peritonitis; chronic splenitis; hypertrophy of the heart; arterial sclerosis.

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ANTHROPOMETRY

ALEŠ HRDLIČKA

B.—INTRODUCTION TO ANTHROPOMETRY

I

Some day it may be possible to write on the actual state of anthropometry in general, and on the many individual modifications of and tendencies in the same which are outside of international agreements; but what the student of the branch in this country needs now are simple, practical, well tested instructions for his guidance in work which is rapidly increasing. An active interest in the various lines of research which fall within the scope of physical anthropology is rising everywhere, as witnessed by the increasingly frequent calls at our laboratories from different parts of the country for instruments, help and directions, by the number and calibre of our visitors, and the unprecedented demand for trained anthropologists.

These conditions were brought about partly by the war, which offered suddenly such vast opportunities for applied as well as research anthropometry; partly by the intensification of the problems of immigration, Americanization, and conservation of child life, which are receiving a steadily increased attention; and partly by a gradually augmenting institutional demand for instruction and work in anthropology. These rapidly developing demands found us unprepared and unable to give much material help. We had no available trained men and they could not be produced in a short time. We found ourselves without adequate supply of instruments and with curtailed or lost facilities for having these made. And we had nothing in this country in the way of publications that would give the indispensable information as to methods, technique and other essential aspects of anthropometric procedure.

The results of this state of affairs aggravated by various complications, were that anthropometric research in connection with the army has been a failure; that we cannot fill even the most important places in anthropology; and that in the absence of something better a large

amount of present anthropometric work on children and older subjects is carried on with the instruments and the methods of the gymnasia and physical culture establishments rather than those of classical anthropometry, with the consequence that practically all this work is lost to science and even tends to create prejudice against anthropometry in general.

Evidently enough it is imperative for those who have the interests of physical anthropology in this country at heart to mend conditions as rapidly as may be possible, and one of the first and most urgently desirable steps is to furnish legitimate, readily utilizable instructions in scientific anthropometry. It was with this end in view that this JOURNAL republished in its foregoing number the International Agreements on Anthropometry, the most binding of all of our instructions. But these alone are not sufficient. They are in certain respects incomplete and somewhat too curt. Moreover, they do not deal with descriptive characteristics and, while forming a necessary nucleus, are not all that the student wants and needs. Some good instructions in English for taking measurements and observations are to be found in the "Notes and Queries on Anthropology" of the British Association for the Advancement of Science, but the subject there is not dealt with as much in detail as desirable. The American student in anthropology, and in growing measure also the American medical investigator, asks for a readily available, as simple as possible and yet sufficiently comprehensive, strictly modern, and thoroughly correct treatise on anthropometry.

The question is how and how far these demands may be met under the present circumstances. Were American anthropologists more numerous, the best way would doubtless be for them to undertake the important task jointly and impersonally. As conditions are, however, it appears that the first steps must be individual; and in taking the same the author does so only because his extensive field as well as laboratory experience in this line gives hope that something serviceable may be accomplished. His work has been based throughout on the methods of the *École d'Anthropologie* in Paris and on the so far effected international agreements, with only such additions or modifications as experience on different races, classes, and ages of people and on their skeletal remains has shown to be necessary or advisable.

The procedures, instruments, etc., to be here described, are those in regular use at the Division of Physical Anthropology, U. S. National

Museum and in field work for the same. They are also, in the main, in use at Harvard and elsewhere, and form the basis of instruction given to the students who apply for that purpose at the National Museum.

II

Two of the main lessons taught by experience in anthropometry are, the need of precision, and the value of simplicity. Precision is a matter of proper well tested instruments, of good instruction, and of that something in the nature of the investigator, whether inherent or built up, which strives for accuracy and abhors looseness. Simplicity is the open road to advance. The road that is clogged by a multitude of unnecessary measurements and digressions leads generally to stagnation.

It is self-evident that in a branch of research where so much depends on accurate measurements, the objects of first importance are the *instruments*. The instruments should be accurate and not easily disordered; they should be in the highest degree well-balanced and "handy" or easy of manipulation, as well as of reading; they should be free from qualities that in the long run might in any way bias the determinations; and they should be easily transportable for field work. Finally their cost should not be prohibitive.

Before the war we had such instruments. The best were those made on the original patterns of Broca, the father of anthropometry, or with useful modifications, by Collin and Mathieu in Paris; but nice sets were also made in Switzerland. During and since the war the supply of French instruments has ceased, with the resumption uncertain, while the Swiss instruments have advanced considerably in price and are not readily obtainable. Also they retain the disadvantage of a small "compas d'épaisseur," one that does not permit the measurement of the height of the head which has become of much importance. The American instrument makers could not as yet be prevailed upon to undertake the manufacture of anthropometric instruments at reasonable prices. We are therefore confronted with difficulties that cannot be readily surmounted. As a result anthropometric work has already been considerably interfered with in this country and on numerous occasions the instruments used are the less adapted and less accurate ones used for gymnastic purposes.

With proper instruments, the next absolute necessity in scientific anthropometry is proper *instruction*. This point was strongly insisted upon during the conference of the International Committee on Unifica-

tion of Anthropometric Procedures at Geneva (1912), and becomes more pressing as time goes on. A person who is a medical graduate, or is used to the manipulation of other instruments of precision, is not yet thereby fitted to practice anthropometry. He could conceivably develop, by much reading and long practice, an efficient system of his own, but only with much loss of time and many errors. The work of self-instructed and insufficiently instructed observers has filled the earlier anthropological literature with reports in which no one is able to place full confidence, and such work has served to retard rather than favor progress, as well as to create much undeserved prejudice as to the value of anthropometry.

Today a would-be anthropologist who is not known to have received competent instruction in the generally approved methods of the science finds it hard to publish his results in professional periodicals and hard to have it accepted by first class institutions; his efforts, in fact, are often lost and he ends by becoming thoroughly discouraged.

Anthropometry deals with such a variety of conditions and often with so small differences of proportions, that of necessity it must be reduced to a rigid system, which while not beyond attainment from mere reading and practice, is much more readily and satisfactorily imparted to the student at a well-recognized anthropometric laboratory. Such laboratories are now available in this country as well as in France and England, besides other countries.

With proper instruments and proper instruction, and unyielding sense of honesty, the worker in anthropometry must develop a habit of minute care and accuracy, until these become automatic. Some students appear to be incapable of acquiring these habits in sufficiently effective form, and such students should give up anthropometry. In a few the needed qualities are inborn and need only a direction; but in most they must be developed. It is fortunate that the most careful and accurate work brings the most pleasure, and is the best sustainer. The student who gets tired of measuring the human form or even the skeleton, is the one who has not been careful and accurate to the limit of his possibilities.

Accuracy and endless care do not, of course, mean absolute perfection—only its highest attainable degree. Our instruments will never be so accurate or senses so precise, and our subjects or specimens will never offer such forms that an absolute precision may be obtained. Time and again the student on repeating a most carefully made measurement, will find a slight difference, an experience which at first

may be discouraging. But with the careful and well trained observer such differences remain immaterial and never develop into unconscious bias in any direction, as they are very likely to do with the less well trained or less strict worker.

The first law of anthropometry being *precision*, the second is that of *simplicity*.

The goal of rational anthropometry is the greatest possible simplicity of procedure in measurements, in the treatment of data, in publications. A profusion of measurements marks the beginner, the amateur, the absorbed, impractical teacher. The experienced, clear-sighted observer will be seen to take only such measurements and observations as will most help him to describe a given people, or bring out the salient points on a collection of specimens. He has two golden rules in this connection which he follows—first, to attempt no measurements on the living which can be more easily and accurately secured on the skeleton; and second, to include no more measurements on any occasion than can be secured on the largest obtainable number of subjects or specimens.

It is self-evident that there can be little use of spending valuable time in trying to take measurements on the living for which the landmarks are uncertain or which call for resented exposures, so long as we may obtain skeletal remains of the people in question on which the problems involved may be studied with greater facility; and it would be a poor anthropological procedure which would give preference of the number of measurements to the number of subjects to be examined. The number of measurements and observations may safely be said to be as a rule subordinate to the number of subjects studied, and to interests of prompt elaboration and publication of the data.

The treatment and analysis of the secured data are naturally procedures of the greatest importance, for on them will depend, next to the accuracy of the data, the value of the report to be published.

Due to the nature of anthropological measurements and observations, their treatment must be in part mathematical and in part biological, but both of these methods are capable of unnecessary complexities. Given a completed series of trustworthy data, the objects of the student naturally will be, first, to extract out of these data their full anthropological value; and second, to present these results in the most scientific and at the same time assimilable form to the forum of his fellow anthropologists. All this calls again essentially for solidity and simplicity. The publications should be free

from "unfinished business" and perplexing formulæ. They must not be an extension of the laboratory blackboard or scrap-paper. The calculations and analyses, whatever their nature may be, are parts of the preparation of the material, and except in explanatory notes ought not to constitute a part of the final report. No calculation in anthropometry is so abstruse that it could not be presented in the final report in plain terms, freely and unequivocally intelligible to all workers in the branch, and to other intelligent readers. Whenever a doubt arises in the mind of a conscientious worker as to what method of analysis or special presentation would be preferable—and there will be not a few of such cases—his best guides will be the relative usefulness of the procedure, and the simplicity of presentation.

Most of these points will be dealt with further on special occasions.

III

The best and in fact the only sufficient *preparation* for scientific anthropometry, are the studies which lead to the degree of doctor of medicine. In fault of such complete courses there should be at least equivalent courses in anatomy, physiology and pathology. Being the comparative science of man, physical anthropology and its handmaid anthropometry deal with the whole range of human variation, which, while essentially structural and functional, is at every step modified or modifiable by pathological conditions. The student with a simple A.B. or Ph.D. without the special courses here mentioned, has a great and often insurmountable disadvantage for a career in physical anthropology even though he was able to receive legitimate instruction in the latter and training in anthropometry. He will remain a bird with a paralyzed wing.

Besides a suitable scientific foundation the worker-to-be in anthropometry should possess a good reading knowledge, in addition to English, of the French and German languages, at least, for the bulk of anthropological literature is still in those languages and there are very few translations. He should further possess good training in drawing as well as in photography. Moreover, if he is to make anthropology and anthropometry his life vocation he must also possess certain physical qualifications. He must have good, enduring eyesight; and large capacity for work both in the field and in the laboratory. Last but not least, he should possess those mental qualities which will enable him to follow his work with undimmed enthusiasm and vigor under smaller material compensation and perhaps other

advantages than those of his friends who have remained in medical practice or chosen other vocations; for anthropology is not an industrial necessity. The compensations for this lie in the high grade of his work. He deals intimately with the highest of organisms, he contributes to the knowledge of what is most worth while. His studies of human evolution and antiquity, of the developing child and youth, of the infinite variation of full-blown manhood and womanhood, of the laws that control all this, and of the means by which these laws may consciously and effectively be directed for future advance of humanity—all these will provide him with mental food of such an order that he will easily forget the regrets of not having chosen a more remunerative vocation.

IV

Granted a well qualified student presents himself at our Laboratory for a thorough instruction in anthropometry, what will be the procedure? The preliminaries may be outlined as follows:

1. *Acquaintance with Instruments.*—Anthropometry commands a number of special instruments, which in exactly the same form are used in no other branch of science. These instruments are graduated in the metric system, which must be well understood by the scholars. They are all graduated in centimeters and millimeters, and this indicates the most natural and safest way of recording the data. Their marking, however, presents certain differences and peculiarities which must be thoroughly mastered, or they will lead to errors. Therefore the first lesson and practice will relate to a thorough acquaintance with the most common instruments; while the next will be devoted to their handling.

2. The *handling of instruments* is a matter of considerable concern. They may be handled uncouthly, and in such a way that they will tire the hand and eyes, even if not conducing to errors; and they may be handled so that they completely cease to be sensed as something foreign in the hand or to the eye, and offer not the slightest impediment to work however prolonged. Even in anthropometric laboratories and text-books, however, the methods practiced or advocated are not the same throughout, wherefore the student will need a careful guidance. An interesting fact in this connection is that all hands, short or long, stout or slender, are not equally adapted to any method and will generally result in more or less individual modification in the direction of least resistance. Also a long practice with a method that

in itself is not the very best may lead to fair efficiency, which with personal reasons explains why more than one method are being perpetuated.

Attention to Instruments.—Anthropometric instruments demand a certain amount of careful attention, especially on expeditions. They should be well nicked, to prevent rusting. They must work smoothly but not loosely. The joints and slide boxes should be kept slightly oiled, but so as not to soil the fingers of the operator. All the instruments should be periodically tested on standards, which gives the worker due confidence. If a thermometer is used it should be an instrument with plainly legible scale and one which will without fail give the maximum record within five minutes. Rapid thermometers are not especially advantageous, they break more readily, being made of thinner glass. To keep the thermometer clean a small bottle of peroxide or other antiseptic is provided, in which the instrument is kept between use. A towel or two should be kept on hand to clean the instruments as desirable in the course of the procedure. Finally, due attention must be given the instruments in connection with storage in the laboratory between examinations, and in connection with transportation. They should have a suitable glass-door case in the laboratory, and a specially made portable box or case for outside and field work.

3. A *study of landmarks* should logically be the next step. Measurements, to be strictly comparable, must be taken in a strictly defined way and from or between the same anatomical points. These points, whether on the living or on the skeletal parts are known as the anthropometric landmarks, with which the student must become thoroughly acquainted. To facilitate this he should begin with the most needed points on a good series of dry skulls of both sexes and widely differing ages where he may learn their exact location, significance and variation. An additional skull of a young and one of adult anthropoid ape, particularly the chimpanzee, are very useful in this connection.

From dry material but with this still at hand, the student will pass to the determination of the needed landmarks on living male adults, then on females and finally on children. He should invariably now and even later mark some of the points with an aniline pencil, which will facilitate his measurements.

4. In the actual *practice of measuring*, it is necessary to impress the student with the necessity of concentration of his attention on the subject or specimen within his hands and on the scale of his instrument;

the holding and handling of the instrument will rapidly become automatic. With subject in convenient position, the landmarks determined, and the instruments properly used, everything depends on the accuracy of reading of the scale. More and larger errors probably are committed in reading the scale in a poor light, by defective eyes, on instruments the scale markings of which have become dulled, and by carelessness, than through all other agencies. One of the best rules at this period is to make a double reading of each determination, and after having finished and made records, to repeat all the measurements. Nothing at this stage teaches as effectively as errors self-detected.

V

Principles of Recording. Blanks.—Every definite piece of anthropometric research calls for a well reasoned out and organized scheme. The student should be fully conscious of what he wants to ascertain. The objects of any given piece of work are such and such, and to attain them it will be most useful, or indispensable, to take such and such measurements and observations. For the records of these measurements and observations are arranged blanks on which they are placed in the order of their importance, relation and best practical sequence. Each blank is made so that it will serve, say, for twenty-five cases (two giving us 50, four 100), and is then printed or otherwise multiplied in sufficient numbers for the study at hand. A good blank facilitates greatly the whole procedure of measuring and observation, as well as the subsequent reduction of the data.

The size of the blanks is of considerable importance. The individual blanks for work on adults should not be larger than standard letter size paper (roughly 21.5 x 27 cm. or 8½ x 10½ in.). For all extensive work they should be printed. For a regular piece of anthropometric research more than one form will be required, and the separate forms should be marked with consecutive numbers or letters. Each blank bears an appropriate heading; is subdivided by seven horizontal lines so as to afford space for the legends, for the measurements of 25 subjects, and a space below where the summaries of the measurements or observations may be recorded. Each blank bears also a series of vertical lines for the records of the individual measurements or observations. The width of the resulting columns is regulated by the needs in each case, and should be ample enough to permit the making of plainly legible records without crowding. In the case of visual observations the records are of necessity and with advantage made by

abbreviations. The left margin of each blank bears two perforations for binding. For a definite piece of work from four to six blanks of each number, sufficient for 100 to 150 individuals, are bound or clasped in loose-leaf covers, and each set is separated by a blotter. This gives a very convenient "record-book," which is easily handled during the examination, whether this is carried on in field or laboratory, which is very convenient during the work on the data, and which can not be readily lost or mislaid. Illustrations of blanks and books will be given later.

Subjects of only one group, one sex and one stage of life are recorded on one blank, to save copying. The measurements are recorded in centimeters and their decimals, as they are marked on the instruments. To make the record in millimeters and meters, according to the essentially German method, has the disadvantages of a greater liability to error, and of a much greater difficulty of grasping and remembering the values of the measurements. The examiner records the figures himself to further guard against error; and until his mind is so trained that it can safely retain two successive determinations, he records each measurement by itself. A constant care is exercised to make each figure so that it will not be possible to mistake it for anything else; this applies particularly to 0 and 6, 4 and 9, 1 and 7, which if written hastily may readily resemble and be mistaken for each other. The recording is done invariably in pen and with permanent ink that will not fade out in the course of years, for some of the records secured may be of value long afterwards.

Although there would be no objection to a contrary practice, it is customary and doubtless more convenient as well as time saving, to proceed in our examination and hence on our blanks first with the measurements and then with the visual observations.

In choosing a *place for examination*, it is imperative to select the best lighted spot, and at the same time one where the observer will be least subject to interruptions. Side-light is undesirable; and measuring or examining in poor light or in artificial light, except perhaps strong electric arc light, is to be avoided unless dictated by absolute necessity. No conversation with the subject or a third person should be carried on during the examination, in order that the whole attention of the observer may be concentrated on the work itself. Finally, while it is not necessary to put down on the blank each measurement separately, not more than two consecutive measurements should be carried in mind before recording them. In the examination of

women it is important to retain the attitude of the methodic, abstract investigator.

If the above rules are followed, the well-trained, earnest observer will find his work reduced to a mechanical procedure of high order, which will not tire him either mentally or physically and the precision of which will be a source of constant gratification.

VI

Selection of Subjects.—In the study of any human group the value of the data—all other things being equal—will be directly proportionate to the purity of the group. With this point in view the first steps of the observer will be directed towards a proper selection. Selection by sex, age, homogeneity, pathological conditions, and occasionally also according to occupation, social status, and environmental distinctions.

As an invariable rule, each sex is to be recorded on separate blanks, and in the case of children and adolescents the same is also true of each age.

Subjects.—In work among the living, and particularly in field work among primitive tribes, one of the main concerns of the student is to obtain a sufficient number of good subjects. In order to do so he generally must have some help. Conditions will differ in this respect according to the group studied. In the case of schools, institutions, and recruiting stations, matters may be easily arranged. But when groups or tribes where submission to measurements can only be voluntary, are to be studied, the investigator must secure assistance. Among our own people much can be done by the observer making known as widely as possible the objects of his work and his needs; by interesting helpful friends in the work; and by engaging one or more active individuals who will assist him for a compensation. Among primitive tribes the best policy is, in the first place, to bring influential introductions; in the second place, to acquaint the chiefs and elders honestly and plainly with the objects of the work as far as they may comprehend; and by engaging, for a compensation, the best available men and women of the tribe to bring subjects. The compensation is best arranged at so much per subject, and as a rule it is also advisable to make a regular small payment to each subject. In explaining the objects of anthropometric work to primitive men and women it is best to dwell on the medical side of the examination, *i.e.*, the desire to ascertain the state of health and strength in the tribe

with the diseases and causes of death, matters which they readily understand and appreciate. It is hardly necessary to add that the success of the student in anthropometry, with civilized as well as with primitive peoples, will depend in the main on his address and general behaviour. The honest, friendly and able worker, with earnest, dignified procedure, will have little difficulty in succeeding among any class of people.

Grouping.—The grouping will be guided by precedence and what may be called the scientific sense. It may differ somewhat according to the number of available subjects. In series of ample size, the segregation up to 6 weeks of age should be by weeks, from that on up to 1 year, by months. From 1 and up to $3\frac{1}{2}$ years, by half a year; and thereafter by the year. The months and years are counted in such a way that "6 months," for instance, will embrace everything from 5 months and 16 days to 6 months and 15 days, while "6 years" will include all subjects from $5\frac{1}{2}$ to $6\frac{1}{2}$ years.¹ The grouping of small series of subjects is difficult, but the standard scheme should be followed as far as practicable. In especially important small series it is advisable to give the exact ages. The adopted system of grouping must, of course, always be clearly outlined in the report on the observations.

It is safe to include young men from 20 and young women from 18 years onward among adults, provided these subjects are not represented disproportionately in the series examined. It would not be proper, however, to take a class of such sub-adults, especially males, as fully equivalent to the full-grown of the same racial or social group, particularly in stature, chest, and few other measurements.

In a similar way individuals from 60 to 70 years of age should not be included in a general series if represented by a larger relative number than that by which they are represented in the general population. If more are available, they should be placed in a series of their own; and this precaution should be invariably followed with those above 70. The reason for separating the old is that various features and proportions have altered and continue to alter to the end of their life. These comprise the nose, ears, jaws, chest, stature and other parts. The only dimensions that are not appreciably altered in senility are those of the head, with the length of the limbs, hands and feet, and pelvic dimensions.

¹ This method is preferable to that which would include under the "6 years" all subjects between 6 and 7.

Estimation of Age.—So long as the student deals with Whites only, there will be little difficulty about ascertaining the ages of his subjects; but among more primitive peoples records of age are seldom kept and the observer will have to take a recourse to estimates. The value of such estimates will be directly proportionate to the care with which they are made and the experience of the one making them in that direction. They are least reliable in childhood, and again in old age. In arriving at his conclusion the observer is guided by the general development or condition of the subject; by the eruption of certain teeth, particularly the permanent molars; by marks of puberty and climacterium; and by signs of aging such as grayness, wrinkling, bending of the spine, loss and wear of the teeth, absorption of the jaws, changes in sight and hearing, arcus senilis, clubbing of the fingers, etc. But it must be borne in mind that none of these signs individually, nor even in combination, can be taken as precise indices of age in years. They develop at widely different ages in different individuals, and even in the same person the appearance of the different signs of ageing may be very irregular. Thus, grayness may occur even in young adults, and the same is true of certain changes in the eyes and ears. Moreover they do not appear synchronously or equally in the cultured whites and other races. The student must be guided by the sum of the manifestations, supplemented by the subject's behaviour and by such indirect information (references to certain well known events, etc.) as may be obtainable. But even thus and with ample experience he cannot hope for closer approximation to the right age than within five years, plus or minus, among adults. For anthropometric purposes, however, such an approximation will be quite sufficient.

Admixture of Blood.—Admixture of blood is of two main kinds: (1) That between individuals of different tribes or other groups of the same race; and (2) That between individuals of different races. In general the latter is the more important, and every effort must be made by the investigator to detect individuals who bear such mixture and exclude them from his series. This applies particularly when we deal with mixtures of the four great stocks of mankind, namely the Whites, the Yellow-browns, the African Negro, and the Negrito. For the sake of greater accuracy it would be well to speak of these great groups always as "stocks" or "strains," reserving the word "races" for the primary groups within these stocks—such as for instance the Nordics, Alpines, and the Mediterraneans among the Europeans.

The progeny of mixtures between individuals within the same stock

are often unrecognizable and cannot be separated except on the basis of their family history. The progeny of mixtures or individuals belonging to different stocks are in general easier to recognize, but this facility differs according to the stocks concerned, for these are not all anthropologically equidistant. Thus the Whites and the Yellow-browns (including native Americans), and again the Negro and the Negrito, are more closely related than either of the former is with either of the latter, and their mixtures will be correspondingly more difficult to separate. Nevertheless with experience, care and certain tests such a separation may be said to be always possible where the mixture is one half and one half, and nearly always where it is one fourth and three fourths; but when the proportion of the blood of one of the component races is less than one fourth the identification of the mixed-blood as such is frequently a matter of considerable difficulty and in mixtures other than those of the negro and white may be impossible. The estimate of the exact amount of particular blood in a given mix-breed is always more or less a matter of conjecture.

The criteria which guide us in diagnosing mixed-bloods, are the physiognomy, the color of the skin, the characters of the hair, the color of the eyes and the tinge of the mucous membranes. Features such as the mongolic fold of the upper eyelid, shovel-shaped (deeply concave) median upper incisors, marked freckles, etc., may be additional helps in individual cases, particularly in mixtures of Whites and Yellow-browns. The color of the skin should be observed on the usually covered parts of the chest.

Skin Tests for Mixed-Bloods.—On the pectoral parts of the chest may also be made certain tests developed by the writer which in many instances of doubtful mixtures between Whites and Indians or other Yellow-browns, and between Whites and other colored races, will help us to arrive at a conclusion. They are tests for the blood reaction of the skin. In a full-blood individual of the Yellow-brown or other dark races, if the chest is exposed and the observer makes three or four vertical lines over the pectoral parts by drawing his finger nail over the skin with a certain amount of pressure, there will be little or no visible reaction; but if there is any mixture with Whites the lines will show as fairly broad red marks, and the flush will be of some duration—both features being the more marked the more white blood is present in the individual under examination, provided he is in the ordinary state of health. In malarial, anaemic and phthisical subjects,

where the condition and supply of blood are much altered, the value of this test does not hold good.

The exact paternal or maternal *parentage* may in some cases be determinable through heritage of special features; but the need for such identification arises only in special instances.

Pathological Conditions.—In examining any group for purely anthropological purposes it is obviously desirable to avoid the inclusion of any individuals who may have been affected by some pathological condition sufficiently to suffer a material alteration in their measurements. It is in this connection that practical knowledge of human pathology in the observer becomes necessary.

The disease that is responsible for most of the alterations that constitute sufficient reason for the elimination of the subject from our series, is rachitis. The evidence of this morbid process may exist in more or less deformed limbs, in pitted or eroded-like teeth, deformities of the thorax, ribs and pelvis, in various asymmetries, and in cranial deformations due to premature occlusion of some part of the sutures. Generally we find more than one of these defects in the same person. Markedly bowed legs, deformed thorax, or badly deformed pelvis, are sufficient reasons for excluding the subject from the examination.

Other pathological processes the results of which will often unfit the subject for anthropometric studies, are tuberculosis of the bones and joints, and various forms of paralysis. The former lead to deformities of the spine and of individual limbs, while the latter may affect directly and indirectly the whole body. The head and face in these cases may of course be unaffected and utilizable for our observations, but unless we can in addition get also a normal stature, it is better to exclude the individual.

In addition to the above the observer will meet with persons of defective constitution due to hereditary syphilis or other causes; and on the other hand he may find individuals in whom the body, the head, the facial parts, or individual limbs or features, may be overgrown (acromegaly, giantism), under-developed (dwarfing, cretinism), or seriously altered by other pathological conditions (congenital defects of individual parts or limbs, gross anomalies, microcephaly, hydrocephalus, arthritic lesions, wounds and fractures). The rule in such cases is, that wherever the condition or deformity is such that normal measurements and observations cannot be secured, the subject is not to be used for anthropological purposes. But if the deformity applies merely to one limb or part, this part alone needs to be excluded.

Cranial Deformations.—Cranial deformations, of whatever origin, are of particular importance to anthropometry, particularly as even in cases of skulls, where they are much more easily distinguished, they are known to have been included with or taken for normal variations.

The *pathological deformations* of the vault most commonly met with are *scaphocephaly*, where the vault is abnormally prolonged and the sagittal region resembles more or less the keel of a boat. This deformity, which may be accompanied by a broad annular retrocoronal depression, is due to premature occlusion of the sagittal suture. It is particularly common among the American negroes. Another form is *acrocephaly*, or abnormal increase in the height of the fore part of the vault, due in the main to premature occlusion of parts of the coronal suture. Still another frequent deformation which, however, does not except in pronounced cases necessitate the elimination of the subject, is *plagiocephaly*, or asymmetry of the vault, generally produced by premature occlusion of the coronal or lamboid suture on one side. In these cases we will find one side of the forehead to protrude more forward and the opposite side of the occiput to protrude more backward than the other side, besides which there may be differences in the parietal regions. In minor cases of plagiocephaly, however, the principal measurements of the vault are not perceptibly altered and there is no need to eliminate the subject.

Posthumous deformations of the skull are met with occasionally. They may be localized or diffuse, the latter being generally lateral or bilateral. They may or may not be attended by warping or fractures. The more important grades are easily diagnosed. The specimens must of course be eliminated.

Artificial Deformations.—Besides the above, the student will meet more or less frequently, according to the people he is working among, with head deformations produced by artificial means. These are divisible into *non-intentional* and *intentional*. The non-intentional kind are as a rule produced in early infancy by the head of the infant lying habitually in a certain position on a resistant cushion. They consist of occipital or occipito-parietal flattening, which may be median or lateral, slight, medium or pronounced.

Intentional artificial deformations, which are particularly common in certain parts of this continent and among certain Pacific Islanders, are designed shapings of the head of the new-born infant, as a result of a habitual or religious observance. They are produced by the continued application of direct pressure, by board and pad, bandage and

pads, or by a bandage alone, to the head of the new-born. They are of three main classes, namely, fronto-occipital (flat-head), circumferential (macrocephalous or Aymara), and occipital.

The "flat-heads" are characterized by a greater or lesser flattening of the front, a corresponding flattening of the occiput, a compensatory bulging of the parietal regions, a more or less marked depression along and just posterior to the coronal suture, and occasionally a more or less marked depression along the posterior portions of the sagittal suture.

The "Aymara" deformations are characterized by a more or less marked, broad, circular flattening or depression passing over the frontal bone, the temporal squammas and the lower parts of the parietals, and over the lower portion of the occipital, while the posterior and superior portion of the parietals and the upper part of the occipital protrude in a compensatory way upward and backward. Anterior to the coronal suture in these cases there is generally an elevation, while posterior to the suture we find a more or less pronounced annular depression.

The occipital deformations resemble those produced accidentally, but in general are more marked. They may represent merely a favored and perhaps assisted incidental flattening due to the resistant head cushion, as among the Navahos and Pueblos; or they may occur, due to less effective methods, as by-products of the flat-head deformation with help of bandages, as among the old Peruvians. These deformations generally involve parts of the parietals, and may be median or lateral. They result in shortening, elevation and broadening of the vault, and in making the forehead both higher and more vertical.

Each of the above forms of head deformation presents a number of sub-varieties according to local differences in methods. And in all the deformation, if marked, affects the base, the orbits and the facial parts of the skull. Except in the minimum cases the changes in the cranial characteristics are such that the utilization of such individuals or specimens for anthropological research on the head or skull becomes very difficult, risky and often impossible. All these cases must be carefully excluded so far as measurements of the affected parts go.

Individual instances of small degree deformations of either class may, as already said, be readily mistaken for individual normal conformation, or pass undetected. The subject calls for special attention with each individual, which will be discussed more closely under "Methods."

VII

Photography and Cast-making.—In anthropological investigation, whether among primitive or civilized peoples, it is often highly desirable and may be necessary, in addition to measurements and observations, to take photographs also, and to make facial casts. Directions for these will be given later. In this place it may merely be stated that both photography and casting may well and with advantage be attended to by the observer himself. Nothing is more gratifying and, it may well be added, trouble saving, than one's own good work in these directions. The photographing should be done preferably, if conditions permit, immediately after the measurements and observations on the subject are concluded, for he may not be available at another time. It may even be necessary to take the cast at this time for the subject has sometimes come from a long distance; but for those who may readily be reached the casting may be postponed until after all the anthropometric work is concluded.

VIII

FIELD ANTHROPOMETRY

The preceding introductory considerations may be rounded up by a few remarks as to anthropometry in the field, where conditions will differ radically from those in the laboratory.

Supplies; Transportation.—In general it is best to secure all the supplies for the scientific work of an expedition before departure, and to secure only the best and freshest materials. This applies particularly to plaster-of-paris for facial casts, and to photographic plates and films. The number and variety of articles to be carried along on an expedition cannot be given in detail. It depends largely on the regions to be visited, the prospective length of the expedition, and the experience as well as the wants of the observer. The best rule is to take everything needed, with nothing superfluous.

The cameras and instruments should be well tested before the trip. The plaster-of-paris under ordinary conditions is carried in large tin cans or zinc lined boxes, and the photographic plates and films in their ordinary receptacles. For the tropics all such material should be carried in special light metal boxes, and in the case of the plaster every precaution must be taken against its becoming spoiled by moisture. The photographic necessities should be such as to permit under any circumstances the loading of plates and some test developments of exposures. A complete development of the plates and films and

printing in the field are not advisable, unless the work is carried on in connection with some well established archeological or other exploring station.

An important item never to be neglected in connection with an expedition to primitive tribes is to take along an ample supply of small change, which is invariably rare in out-of-the-way regions; and the money should preferably be used in coin which will not be regarded with suspicion.

Cameras.—It is best to carry two cameras—a pocket kodak for scenes on the road and instantaneous exposures; and a larger camera, preferably with glass plates, for portrait work and larger landscapes. Both cameras should be provided with the best lenses obtainable, and well tried out in every way before departure.

Boxes.—The cameras, instruments, medical supplies and other articles are carried in standard canvas-covered boxes, with rounded corners and rope handles. These boxes should be of such a size that they may be conveniently carried on the backs of men, burros, horses, mules, llamas or camels, as well as in a railroad car or a wagon. They should be made of strong, light wood, preferably gum, well jointed, and have all the hinges on the inside to make robbery difficult. The best way of fastening is with strong padlocks. The size of the boxes found most convenient by the writer (except for the instrument case which should fit these) is, externally, height 18 in. (46 cm.), breadth 20.5 in. (52 cm.) and antero-posteriorly 14 in. (36 cm.). In field these boxes will serve various useful purposes, such as chairs and tables, and at night as a wind break, or base over which in case of rain may be spread a sheet of canvas converting the whole into a sort of shelter or tent; while on the return voyage they may be used to transport casts, photographic plates and specimens. In places where the examinations are carried on the boxes may again serve as chairs and tables; and if there are enough of them, at night they make a very good elevated bank on which to spread one's bed. By suitable inside partitioning one of these boxes may be fitted for medical supplies, one for kitchen utensils, one for the cast-making outfit, another for the photographic apparatus, still another for trinkets and smoking supplies for the natives, etc. The boxes are numbered or otherwise marked so that any desired one may be readily found when needed; and a duplicate set of keys is provided for a case of loss.

Companions.—This is a matter of much more consequence than might at first appear. In general the most satisfactory procedure is

for the observer to engage only such companions as he may need in traveling from place to place. The taking along of friends, co-workers, or even a photographer, not only risks their exposure to sickness and greatly increases the expenses, but is often productive of much friction as to plans, food, time of starting, etc. It may further lead to difficulties in fixing blame for accidents and especially of credit for discoveries; and will frequently be productive of delays and inconveniences, for often where one can find what he needs, two or three cannot be accommodated. Free hand, freedom from anxiety for others, undivided responsibility, and undivided credit, are precious assets which should be carefully guarded by the explorer.

Miscellaneous.—Photographing and even measuring may have to be done by the roadside, in the field, or under other untoward circumstances which often will call for the exercise of not a little ingenuity. But with a fair interpreter, friendly, honest attitude, and such small gifts as may best be fitted to the occasion, the student will as a rule secure the needed observations.

SPECIAL COMMUNICATIONS AND REPORTS

HEIGHTS AND WEIGHTS OF CHILDREN UNDER SIX

ROBERT M. WOODBURY

U. S. Children's Bureau

During the second year of the war the Children's Bureau conducted a series of campaigns in accordance with the general plan outlined in a communication from President Wilson. These campaigns, constituting Children's Year, were designed to focus the attention of the public upon infant and child welfare. The first of these was the weighing and measuring test, the object of which was to secure records for as many children as possible of height, weight, and physical condition. Provision was made at the outset for 500,000 record blanks. The calls came in so rapidly, however, that before the campaign was over 7,500,000 were printed and distributed. Of these, the Bureau has received back from the various State and local chairmen of Child Welfare Committees a total of over 2,000,000 records.

In the course of the campaign the Bureau thus secured a large amount of anthropometric data. Each record contains information in regard to the child's height and weight, age, country of birth of father and mother, race of father and mother, sex of child, and whether or not the child was in good health or had any defects. Provision was also made for the signature of the person making the examination.

It was thought especially desirable to utilize this material to construct new standards of heights and weights for children under six, and to study, in so far as possible, differences in heights and weights for different nationality groups. The studies of heights and weights hitherto published relate in the main to children over 5 years of age. A series of figures relating to children under 5 were secured by Dr. F. S. Crum for the American Medical Association. They are based on the measurements of 10,423 normal babies examined at baby health conferences in 21 States. Besides these, figures given by Dr. L. Emmett Holt, give average heights and weights for children at birth and at intervals of six months up to two years, and by years to the age of five. Other references might be cited, but in the main their

number of cases upon which measurements were based were small and information was presented usually only in the form of averages. The data presented by Dr. Crum, it was thought, might have been influenced by the fact that babies taken to health conferences and contests would likely be above average. Neither of the more extensive investigations gave any figures showing the distributions or ranges of heights and weights, a very important point in connection with certain aspects of nutrition. For children from five to fourteen such distributions have been given, among others, by Elderton for Glasgow children and in a series of studies by Bowditch, Boas and others, on American children. Bowditch, in his well known figures for Boston school children, shows the distribution for heights and weights but his material is not presented in such form that variations in weight by age can be determined for children of given heights.

The mass of material secured in the course of the campaign was so large that it seemed desirable to select the more reliable part for tabulation. It was decided that the best plan would be to take cards only which were signed by physicians. If a physician signed the card it might be assumed that he made an examination or that he exercised supervision over the measurements. During the course of the investigation it was discovered, by means of a questionnaire sent to a small group of physicians, that not all the measurements were taken in accordance with the directions, which were to weigh and measure children under five without clothing. In order, therefore, to make the measurements as accurate as possible questionnaires were sent to every physician whose cards were included in the tabulation; the cards were then tabulated in accordance with the method of weighing and measuring used.

Consultations were held with anthropological, statistical, and medical authorities in regard to subjects to be investigated and methods of investigation. Conferences were held with Dr. Hrdlička, Curator of the National Museum, in regard to anthropometric problems. Certain questions in connection with the tabulation were referred to the Statistical Advisory Committee of the Children's Bureau and a special committee of the pediatric section of the American Medical Association is cooperating in connection with medical questions involved.

The study is well under way. When completed, it will offer a new series of heights and weights for children from birth to six years of age. Tables will be prepared to show the averages for each age and

also to show for each age the ranges and distributions of heights and weights. All tables will show separately boys and girls and white and colored children. The main tabulation will be based only on children with no serious physical defect. The data will be classified also by nationality. Children whose fathers and mothers reported the same country of birth, such as Italy, France, Serbia, are classified as of Italian, French, or Serbian nationality. Comparisons will be made between nationalities or groups in which a large enough number of children have been obtained to give significant results. It will be possible also to compare weights and heights of native born children of native parentage in different sections of the country.

It may prove possible and interesting to find average heights and weights for children with certain defects to determine whether, for example, the presence of adenoids or diseased tonsils affects in any marked degree the height or weight of children.

In one or two states and cities special efforts were made to secure complete examinations of children by physicians. In California and in New York City special instructions were given to examining physicians by the State or local committee in charge. In these districts and in other places it may be possible to study the prevalence of certain of the more common physical defects of children, although in any comparison of the prevalence of such defects differences in the average carefulness of examination must be taken into account.

In the city of Gary, Indiana, in connection with a study of pre-school age which the Bureau was conducting, heights and weights of children were taken by physicians and nurses working under the direction of the Bureau. A very careful physical examination was made of all these children and for these cases, over 4,000 in number, a more intensive study of weight and physical condition will be possible.

For purposes of tabulation the cards are classified by localities and divisions of the country; on account of the large number of cards involved each major division is to be tabulated separately. The work is being pushed as rapidly as possible with the limited staff available, and the results will be published as soon as completed. Abstracts will be promptly published in this JOURNAL.

THE IOWA CHILD WELFARE RESEARCH STATION

The Iowa Child Welfare Research Station was established two years ago by the State Legislature as an integral part of the Graduate College of the State University for detailed and consecutive scientific

investigations of problems in the field of the development of the normal child. The purpose and methods of the station are those of *scientific research* with the laboratories, libraries, and instructional courses of the University as part of its organization and equipment.

At present the station is prepared to give training for the doctorate in child psychology and in the nutrition of the child, with unusual opportunities for scholarly men and women with their degree who wish to continue advanced research under favorable and standardized conditions.

A group of research students are now at work, and the station can offer appointments, with stipends ranging from \$480 to \$1500, as research assistants to exceptional men and women with scientific insight, abandon and preliminary training for research work. The research assistant devotes four hours per day to some phase of research in progress in the station and in addition may carry a schedule of courses or devote himself to his own problems. No teaching is required.

BIRD T. BALDWIN,
Director

BIRTH STATISTICS AND INFANT MORTALITY

PRELIMINARY REPORT OF THE BUREAU OF THE CENSUS FOR 1917

In the birth-registration area of the United States 1,353,792 infants were born alive in 1917, representing a birth rate of 24.6 per 1,000 of population. The total number of deaths in the same area was 776,222, or 14.1 per 1,000. For every State in the registration area, for practically all the cities, and for nearly all the counties, the births exceeded the deaths, in most cases by considerable proportions.

The birth-registration area, established in 1915, has grown rapidly. It comprised, in 1917, the six New England States, Indiana, Kansas, Kentucky, Maryland, Michigan, Minnesota, New York, North Carolina, Ohio, Pennsylvania, Utah, Virginia, Washington, Wisconsin, and the District of Columbia, and had an estimated population of 55,000,000, or about 53 per cent of the estimated total population of the United States in that year.

COMPARISON WITH 1916

The birth rate for the entire birth-registration area fell below that for 1916 by two-tenths of 1 per 1,000 population; but the death rate was less by six-tenths of 1 per 1,000 than in 1916. Thus, the excess

of the birth rate over the death rate for 1917, which amounted to 10.5 per 1,000, was somewhat greater than the corresponding excess for 1916, 10.1 per 1,000, although it fell slightly below that for 1915, 10.9 per 1,000. If the birth and death rates prevailing in any one of these three years were to remain unchanged, and if no migration were to take place to or from the area to which they relate, the population of the area would increase at the rate of slightly more than 1 per cent per annum, or a little more than 10 per cent in a decade. This would be about half the rate—21 per cent—by which the entire population of the United States increased between 1900 and 1910.

WHITE AND COLORED

Of the total number of births reported, 1,280,288, or 24.5 per 1,000, were of white infants, and 73,504, or 25.8 per 1,000, were of colored infants. The death rates for the two elements of the population were 13.7 and 22.5 per 1,000, respectively.

INFANT MORTALITY

The infant mortality rate—that is, the number of deaths of infants under 1 year of age per 1,000 born alive—throughout the birth-registration area as a whole was 93.8 in 1917, as against 101 in 1916 and 100 in 1915. This is equivalent to saying that in 1915 and 1916 of every 10 infants born alive 1 died before reaching the age of 1 year, whereas in 1917 the corresponding ratio was a trifle more than 1 in 11. Among the 20 States these rates ranged from 67.4 for Minnesota to 119.9 for Maryland; and for the white population separately the lowest and the highest rates were, respectively, 66.3 for Washington and 109.5 for New Hampshire.

The infant mortality rates vary greatly for the two sexes and for the various nationalities. The rate for male infants in 1917, 103.7 per 1,000 living births, was nearly 25 per cent greater than that for female infants, which was only 83.3. When the comparison is made on the basis of race or nationality of mother a minimum death-rate of 66.2 per 1,000 births is shown for infants with mothers born in Denmark, Norway, and Sweden, and a maximum of 172.6 for infants with mothers born in Poland, while for Negro children the rate was 148.6.

PLURAL BIRTHS

The reports from the registration area show the birth of 14,394 pairs of twins and 155 sets of triplets in 1917—in all, 29,253 infants, or a little more than 2 per cent of the total number born.

NUMBER OF CHILDREN PER FAMILY

The reports for 1,241,722 of the births occurring in 1917 contained information as to number of child in order of birth. Of these reports, 339,042 were for the first child born to the mother, 264,044 for the second child, 191,528 for the third, 134,331 for the fourth, and 95,931 for the fifth. In the remaining 216,846 cases, or 17.5 per cent of the entire number for which information upon this point was obtained, the total number of children borne by the mother was 6 or more; in 37,914 cases it was 10 or more; in 1,600 cases, 15 or more; in 56 cases, 20 or more; and in 1 case, that of a colored woman, the birth of a twenty-fifth child was reported.

The total number of children borne by the mothers who gave birth to these 1,241,722 infants in 1917, in whose cases data were available as to previous births, was 4,093,908. The reports for 1,194,621 of the births occurring in 1917 contained information as to the entire number of children borne by the mothers and still living, and gave a total of 3,443,466, or an average of very nearly 3 living children in each family in which a birth took place in 1917.

Public Health Reports, June 27, 1919, 1426-7

STEATOPYGY IN HOTTENTOT WOMEN

Dr. E. A. Hooton recently published heliotype reproductions of drawings of two steatopygous Hottentot women (*Harvard African Studies*, 1918, II, 83-100, pls. 1-4). The original drawings belong to the Peabody Museum of Salem, Massachusetts. They were made by two different artists at Cape Town in 1801 and 1803. Though the drawings give evidence of great care in their preparation—one is accompanied by a scale in feet and inches (or pieds and pouces), and the other carries the representation of details so far as to show on the buttocks the "stripes caused by a beating"—they are of less general interest than Dr. Hooton's discussion of steatopygia and related phenomena (pp. 90-99). After passing in review fat-tailed sheep, fat-rumped sheep, mouse lemurs, fat-tailed lemurs, Aurignacian women, Eskimos, Seri Indians, Bushmen-Hottentots, aestivation, the complete hibernation of animals, and the "quasi-hibernation" occasionally observed in man, he concludes:

1. True steatopygia in both sexes has been satisfactorily demonstrated in modern races only among the Bushmen and Hottentots.

2. It seems to have existed in Europe in the Upper Paleolithic period, but most of the figurines of that age and of the succeeding Neolithic period represent women who are merely fat.

3. Steatopygia is probably a functional character acquired through adaptation and transmitted by heredity; it may be referred to environmental conditions involving a regularly recurrent failure of food supply and the consequent alternation of feasts and famines on the part of man.

4. It is possible that steatopygia may have been associated with a hibernation habit in the ancestors of the Bushmen-Hottentots and in the Aurignacian people of Europe.

While there is little reason to doubt that true steatopygia may be transmitted by heredity, conclusions 3 and 4 appear to be open to several objections. Evidence is not presented to show that peoples in which steatopygia is common (it appears to be nowhere universal) are any more able than others to withstand famine, or that among the Hottentots the women on the whole suffer less than the men during scarcity of food. On the other hand it is well known that races in which this character does not occur have accustomed themselves to unfavorable food conditions. Neither fat-tailed sheep nor fat-rumped sheep hibernate; and again, no evidence is presented to show that these breeds are uncommonly resistant to the evils resulting from a capricious food supply. In the most perfectly hibernating mammals such as bats, marmots, ground squirrels, jumping-mice, bears, etc., fat is not concentrated in any one region. Facts like these make it very difficult to believe that human steatopygia is likely to have been acquired through selective adaptation to uncertainties in the food supply or that its presence can in itself be seriously regarded as suggesting the possibility of an ancestral hibernation habit. It seems more probable that this character is not susceptible of any teleological explanation, but that it illustrates a tendency often found among mammals; namely, the tendency for some one member of a group to carry to an extreme the development of a feature which is common to all. Such extreme developments usually appear to be unrelated to direct usefulness, and in some instances they may seem disadvantageous to the race. The following are good examples. Squirrels as a group have bushy tails; in the Bornean *Reithrosciurus* the character of bushiness is pushed to a degree that might be described as caricatural. No special use for such a tail has been imagined and none probably exists in the sense that the unusual tail makes this animal better fitted than ordinary squirrels to meet the requirements of life in tropical forests. Deer are normally provided with antlers, and the size of these structures is in general not obviously disproportionate to the needs of the animals; but in the Irish Elk antler development

was carried to such an extreme that it may have been one of the causes leading to extinction of the species. Similar cases will, I think, be familiar to nearly everyone acquainted with systematic zoology in almost any of its branches. The steatopygia of the Bushmen-Hottentots has the appearance of a peculiarity of this kind. In the genus *Homo* a tendency toward some accumulation of fat in the gluteal region is not unusual, and this tendency is perhaps especially marked in women. Statistical data as to the frequency of steatopygia in the Bushmen-Hottentots are lacking, but it appears as though in these people the fat mass were beginning to develop to somewhat the same extreme degree as the bushiness of the tail in *Reithrosciurus* and the size of the antlers in the Irish elk; precisely why we are not now able to guess.

G. S. MILLER

THE INSTITUTE OF INTERNATIONAL EDUCATION

When the United States entered the war, The American Council on Education was formed to consider measures whereby the educational institutions of the country could best serve the Government. The Council established a Committee on International Education Relations; and this Committee, according to a recent announcement (April, 1919), "soon came to the conclusion that its objects could best be realized by a central bureau of information which would be a clearing house in this country for international relations in education. The result was the establishment of the Institute of International Education."

Some ways in which the institute hopes to serve are as follows: (1) The preparation and dissemination of information concerning institutions, types of training, graduate instruction, and individual courses in the United States; (2) The tabulation of fellowships, scholarships, and other financial aids to students; (3) Promotion of the interchange of professors and other intellectual leaders; (4) Promotion of visits of foreign missions; and (5) Furthering of International scholarships.

The institute, whose headquarters are at 421 W. 117th St., New York City, is governed by an Administration Board, headed by Dr. Stephen P. Duggan, and including men like Nicholas Murray Butler, John Bassett Moore, Henry S. Pritchett, and Henry Morgenthau.

The question occurs, of course, as to the advisability of an organization of this nature working separately from the National Research Council.

LITERATURE

I. ANTHROPOLOGY IN GENERAL

ANTHROPOLOGY AS A UNIVERSITY SUBJECT. By Skinner (H. D.)—*New Zealand J. Sc. and Technol.*, I, No. 5, 1918, 258-264.

This valuable article gives reasons for the desirability of the establishment of a chair of Anthropology at the New Zealand University, by Professor A. C. Haddon (Christ's Coll., Cambridge), C. G. Seligman (Univ. of London), Sir James G. Frazer (Univ. of Liverpool), and R. R. Marett (Univ. of Oxford).

MANKIND. RACIAL VALUES AND THE RACIAL PROSPECTS. By Humphrey (Xeth K.)—8vo, N. Y., 1917, xvi, 223.

The book "aims to present the subject of race untechnically—rather in its broad social aspect—and to awaken in the lay reader an appreciation of the fundamental part played in human affairs by inborn racial quality." The author sees "in racial values effectively conserved the one hope for all future civilization." If society, dependent "more and more on artifice as its complexities increase, does not take the next logical step and extend its control to erratic parenthood wherever found, from the excessive fecundity of the improvident to the voluntary barrenness of the cultured, racial impoverishment will bring us to the common end of all civilizations since the beginning." For America the outlook is not very bright. There is little to be expected here in the way of racial developments except extensive mongrelism. The "melting pot" will only "give us for many generations a perplexing diversity in ancestry, and since our successors must reach back into that ancestry for characteristics, this diversity will increase the uncertainty of their inheritances. They will inherit no stable blended character, because there is no such thing. They will inherit from a mixture of unlike characteristics contributed by unlike peoples, and in their inheritance they will have certain of these characteristics in full identity, while certain others they will not have at all."

A part of the last rather chaotic and gloomy view is fortunately due, it would appear, to author's faith in Madison Grant's book and his not having read Boas' review of that "good" publication.

THE PHYSICAL BASIS OF SOCIETY. By Kelsey (Carl)—New York and London, 1916.

This work, as stated in the preface, is an attempt at a brief sketch of "the physical background of life, the relation of the organism to its

environment, the question of heredity, and the general idea of evolution as applied to human beings and the development of social theory." It makes no pretense to originality, and the writer is very modest in making any claims of importance; nevertheless he has produced a very readable and useful book.

The general contents may be indicated by the chapter-headings: (I) Earth and Man, (II) Mutual Aid and the Struggle for Existence, (III) The Control of Nature, (IV) The Evolution of Man, (V) Heredity, (VI) Heredity and Society, (VII) Race Differences, (VIII) Sex Differences, (IX) The Influence of Society upon Population, (X) Social Institutions, (XI) The Nature of Progress.

The following are a few strictures. As long as Lapouge is quoted quite extensively on mixed races, etc. (296), it would have been proper to have quoted other writers as an antidote, even though Kelsey himself by no means accepts Lapouge's vagaries. The work of Boas and the 1910 Census independently show that the half-blood Indian woman is at least as fertile as the full-blood, in sharp contrast with Lapouge's statement that "infecundity comes through crossing." Why is Ploss quoted from Ellis (327) and not from the latest original edition? And incidently when Ploss (as quoted) is made to say that there is a more frequent occurrence of a high degree of long-headedness among women than among men, certainly it would have been fitting to have given a footnote to the effect that as a matter of fact the skulls of women are in the majority of cases slightly more brachycephalic than those of men of the corresponding race. As long as the Mendelian principles of heredity are carefully explained, it would have been proper to have noted that in certain cases of human hybridization results have been found which thus far have not been explained by them. No one could of course claim to first-hand knowledge on all the subjects touched in the book, and Kelsey has consciously omitted discussion, has quoted from the best available works, and on the whole has produced a book that is sane, full of instructive data, and deserving to be widely read.—TRUMAN MICHELSON.

RACIAL FACTORS IN DEMOCRACY. By Means (Philip Ainsworth)—12mo, Boston (Marshall Jones Co.), 1918, x, 278 pp.

The purposes of this very readable volume are: "(1) To trace the development of civilization from primitive simplicity to its present complexity; (2) to show how, in that development, cultural divergencies between peoples and races have evolved; (3) to point out the faults and virtues of individual cultures, and (4) to point out, constructively, the advantages derivable, by a democratic world-civilization, from a blending of the best in all racial cultures."

The work is sociological rather than anthropological, but it brings forth in an interesting form a number of practical problems in which anthropology is concerned. The author deserves encouragement for further studies in same directions.

EVOLUTION; MAN'S ORIGIN; EARLY MAN

HAS PROGRESSIVE EVOLUTION COME TO AN END? By Conklin (Edwin Grant)—*Natural Hist.*, 1918, I (XIX), No. 1, 35-39.

An excellent discussion, by a past-master in these lines, of a subject that few as yet can approach to grasp; and though so far as physical development is concerned, the author's opinions may not be in full accord with what anthropology seems to indicate, they nevertheless deserve a most considerate attention.

Dr. Conklin's views are that, "There is no evidence and little probability that a higher animal than man will ever appear on this planet. . . . Furthermore, there is no present reason for supposing that in the future man will be more highly organized physically or will be endowed with greater intellectual capacity than have been many individual men of the past or present, though in both body and mind he will probably become better adjusted to conditions of life. It is conceivable that further evolution of the brain of man may occur, just as it is possible to conceive of a further evolution of the neck of the giraffe, or of the trunk of the elephant, but there is a limit to increasing specialization beyond which it is not practicable to go. It is doubtful whether the brain of man could undergo much further differentiation without introducing disharmonies within the organism or with the environment, and the facts that since the beginnings of human records there does not appear to have been any appreciable growth of the brain in size or complexity, and that since the ancient Greeks there has been no appreciable increase in the intellectual capacity of man, plainly indicate that the possible limits of evolution in this direction have been reached. The most that can be hoped for by the scientist is that the standards of races as a whole may more nearly approach the best individual standards which now exist, and under a wise system of eugenics and education this improvement can be effected. . . .

"On the other hand there is good evidence that in social organization and in coöperative efforts the limits of human evolution have not been reached. The future may produce no super-men but it is likely to produce a super-state and a super-civilization. . . .

"With the development of intelligence and of rational society we reach in human evolution the highest stage of organization which has ever been attained and, so far as we can now see, the highest attainable, for we have here not merely the differentiations of the human body and the countless differentiations of human society, but much more we have the control over environment and the forces of nature which makes the man most powerful and speedy of all living things whether on land, in water, or in the air; which gives him a keenness and range of sensation that are unparalleled elsewhere, and which practically extends his nerve connections to all parts of the earth. Man has indeed by means of intelligence added to his own personal powers, the powers of nature. His evolution is no longer limited to his body but takes in the whole of his environment. . . .

"The past evolution of man has occurred almost entirely without conscious human guidance; but with the appearance of intellect and the capacity of profiting by experience, a new and great opportunity and responsibility have been given man of directing rationally and ethically his own evolution."

THE DIRECT ACTION OF ENVIRONMENT AND EVOLUTION. By Kropotkin (Prince)—*The Nineteenth Century*, Jan., 1919, 70-89.

A very good contribution to the mooted questions of the respective roles of environment, mutation, inheritance of acquired variations, and natural selection, in organic evolution. The author's sensible views are perhaps best expressed in the following quotations: "If considerations lying outside the true domain of biology, such as those which inspire the Neo-Lamarckians and inspired Weismann, cease to interfere, a synthetic view of Evolution (in which Natural Selection will be understood as a struggle for life carried on under both its individual and its still more important social aspect) will probably rally most biologists. And if this really takes place, then it will be easy to free ourselves from the reproach which has been addressed to nineteenth-century science: the reproach that while it has aided men to liberate themselves from superstitions, it has ignored those aspects of Nature which ought to have been, in a naturalistic conception of the universe, the very foundations of human Ethics, and of which Bacon and Darwin have already had a glimpse. . . . The prominence which is now beginning to be given to the direct action of environment in the evolution of species, by eliminating the Malthusian idea about the necessity of a competition to the knife between all the individuals of a given species for evolving new species, opens the way for a quite different comprehension of struggle for life, and of Nature altogether."

THE ELEMENTARY NERVOUS SYSTEM. By Parker (G. H.)—12mo, Philadelphia and London (J. B. Lippincott Co.), 1918, 229 pp., 53 fig.

This is the first of a series of memoirs by leading authors, who are to cover in a series of such monographs the field of modern biology. It deals essentially with the nervous system of the three simpler phyla of the multicellular animals, namely the sponges, the coelenterates, and the ctenophores. Its object is to "portray the elementary nervous system as it exists in the simpler animals and in the simpler parts of the more complex forms," and throw more light in this respect on the relation of the lower with higher organic forms, indirectly including man.

The book is not "popular science," but strictly a report of extensive and interesting scientific research. The conclusions are numerous and in cases rather involved; but are summarized for the most part in the statement that "the nervous system of the higher animals is not only a system of tissues derived from a small group of especially sensitive cells associated with a still more primitive element, the

musculature. It is a system that in its more differentiated examples has appropriated to itself certain other elements of the body than those that can be looked upon as direct descendants from an original source."

LOS ORÍGENES DE LA HOMINACIÓN (ESTUDIO DE PREHISTORIA). By Antón y Ferrándiz (Manuel)—Real Academia de la Historia, Madrid, 1917, 1-172, 7 figs.

In the discourse read at the ceremony of his reception as a member of the Royal Academy of History, March 18, 1917, Professor Antón attempts to present in a clear and orderly form the data relating to the scientific controversies with regard to man's origin. His success has been such that this "magnífico discurso," to borrow the expression used by Adolfo Bonilla in his address of reply, is a notable achievement in the literature of anthropological history. This phase of the subject has perhaps never been treated with equal skill in arrangement and presentation. Especially interesting are the accounts of the early controversies about Tertiary man, of those regarding the eoliths, and of the brilliantly poetic speculations of Ameghino. The date, March, 1917, is responsible for the absence of references to Pilgrim, Gregory, Wood Jones, the Vero man; the discussions which these names call to mind indicate the activity which has characterized the short period subsequent to that covered by the work of Professor Antón.—G. S. MILLER.

THE ORIGIN AND MAINTENANCE OF DIVERSITY IN MAN. By Newbigin (Marion I.)—*Geog. Rev.*, N. Y., 1918, VI, Nov. No., 411-420.

After reviewing the course of recent speculation on the origin of diversity in animals and plants Bateson concluded: "The many converging lines of evidence point so clearly to the central fact of the origin of the forms of life by an evolutionary process that we are compelled to accept this deduction, but as to almost all the essential features, whether of cause or mode, by which specific diversity has become what we perceive it to be, we have to confess an ignorance nearly total. The transformation of masses of population by imperceptible steps guided by selection, is, as most of us now see, so inapplicable to the facts, that we can only marvel both at the want of penetration displayed by the advocates of such a proposition, and at the forensic skill by which it was made to appear acceptable even for a time."¹ It is therefore clear that the belief in selection as the principal cause of organic diversity is far from universal among the writers who have most fully examined the evidence. Equally certain is it that many of those who speculate on the development of human peculiarities do not appreciate this fact. Mr. Newbigin, for instance, in discussing the origin and maintenance of diversity in man says that most of those who have thought about the problem in any detail are agreed that the almost infinite diversity of organic life is, in essence,

¹ Problems of Genetics, 1913, p. 248.

a reflection, through survival of the fittest, of the diversity of physical conditions found on the earth's surface, and furthermore that there is a large measure of agreement among biologists as to the mechanism by which plants and animals are able to make adaptive responses to changing environment. The more conspicuous physical or racial differences among men he believes to have been produced by this indirect and slow biological process of geographic adaptation. It "involves a keen struggle for existence and the passage of many generations." The less profound features "for which we have as yet no name save the somewhat vague one of nationality" or "regional grouping" he regards on the other hand as the result of "another more direct and rapidly produced form of adaptation" to geographic conditions, which "can display itself within one or a few generations" and which in modern human societies has nearly or quite superceded the more general process. "Many of the characters which are popularly regarded as race characters," he writes, "seem . . . merely examples of this direct adaptive response to environmental conditions. Take, for example, the presence of seafaring instincts in a people. Many geographers have shown, with a wealth of detail, that wherever we find a coast line fitted for maritime enterprise, we are likely to find a population who are seafarers by instinct. Some go further and regard this as a 'racial' character. Thus many speak of the English love of the sea as an Anglo-Saxon racial character. But within England, small as is the total area, there is a very sharp contrast between the coast dwellers, those with an 'instinctive' knowledge and love of the sea, and the inland people to whom it is vast, mysterious, dangerous. So obvious is the distinction to close observers that keen advocates of the racial theory are constrained to take a further step and assume that the maritime population represents a distinct strain, despite the obvious physical differences between the fishers in different parts of the long coast of Great Britain and its connected islands. But if the fishing population has well-marked common characters as regards habits and modes of life and general outlook, so have the miners. Will the racialist take the further step and assume that the pitmen, though deep mining rose but yesterday, are of the same race in all the parts of Great Britain in which they occur? The suggestion is obviously absurd. Again, that the Slavs are not seafarers and the Greeks are, is a geographical commonplace. But where the Slavs come down to a sea eminently suitable for coastal navigation, in Dalmatia, there they show all the characters of a maritime people. . . . So when the Greek settles in the interior of Asia Minor he loses his supposed racial characters and becomes merged in the general population of tillers of the soil. All such cases—and many other examples could be given—suggest that where environmental influences are permitted to operate, there is a rapid response in the form of new regional groupings, *i.e.*, of incipient nationalities."

The two kinds of differentiation whose peculiarities Mr. Newbigin points out are obviously to a certain degree coincident with geographic

conditions: Eskimos live in arctic regions where Congo Pygmies are not found; seafaring peoples are confined to coasts, and agricultural communities do not exist in deserts. That the main cause of either process has been selective geographic adaptation is, however, an assumption not supported by the evidence of biology. Very distinct races of modern man are found in humid equatorial regions—Congo, Borneo, Amazonia—where geographic conditions have no corresponding contrasts. Even when physical differences and geographic contrasts coexist, as in the case of the Papuan and Mongolian, or Negrito and Caucasian, no definite relationship has been discovered between the particular characters of the people and the particular characters of their environments. "Adaptation" therefore does not explain the facts; and it is necessary for the present to confess with Bateson our ignorance about the mode of origin and establishment of physical racial features. As to the causes that underlie the formation of "regional grouping" and "nationality" there appears to be little doubt that they are mainly psychological. They have been elaborately described by Tarde,² who has shown that, while geographic conditions may determine the general character of human activities, the actual formation of groups is primarily due to the inherent tendency to mutual imitation from which the members of no community can escape, and on which the existence and development of all human society depends.—G. S. MILLER.

A CONTRIBUTION TO THE EVOLUTION AND MORPHOLOGY OF THE HUMAN SKULL, INCLUDING A COMPARATIVE STUDY OF THE CRANIA OF CERTAIN FOSSIL HOMINIDÆ. By Cameron (John)—*Trans. Roy. Soc. Canada*, March, 1919, ser. 3, xii, 149–183, figs. 1–15.

The discovery of the Piltdown man was the main stimulus to the production of Dr. Cameron's paper, for it impressed the author with the value of making a comparative investigation of the various cranial types of fossil *Hominidæ*. "In carrying out this research," he says, "it was found that the most valuable information gained from the evolutionary standpoint was secured by a study of the following indices and cranial measurements: 1, the fronto-parietal index; 2, the calvarial height; 3, the bregmatic angle and the cranial curvatures; 4, other angular cranial measurements." Some of the more important conclusions are summarized as follows (pp. 181–182):

The minimum post-orbital diameter, the maximum parietal breadth and the fronto-parietal index of the Piltdown cranium are all consistently within the range of variation of these in the modern European type of skull.

On comparing the outline of the Piltdown skull with that of the Neanderthal specimen on the same standardised glabella-inion line, it was found that the latter outline was situated very much below the other. Now the geological strata in which the Piltdown remains were found indicated that they were much more ancient than the Neander-

² Les Lois de l'Imitation, Paris, 1890; 2d edition, 1895.

thal. Therefore it is clear that the cranial outline of Neanderthal man is chronologically in the wrong position, a fact which helps to prove that he was a degenerate off-shoot from the main evolutionary stem, and probably became extinct.

If the Neanderthal or Mousterian type of skull must not be utilised as a stage in the main path of evolutionary progress, it is apparent that there is a vast gap between the stages represented by the Java man-ape and Piltdown man which still requires to be filled up. Thus a very important "link," in the evolution of the brain and skull is really still "missing." In fact that link in the chain connecting the Java man-ape with *Homo sapiens* has still to be forged, in order to prove that *Pithecanthropus erectus* is really an ancestral type for modern man.

It is difficult to accept the view that the Piltdown skull which possesses an amount of frontal development far above that of many modern races could lay claim to the low type of jaw accredited to it. The writer is therefore inclined to support the recent opinion of Miller who states that the characters of the jaw are such that it could not have belonged to the skull but to a new species of anthropoid ape named by him *Pan vetus*.

The outlines and diagrams by which the paper is illustrated are of unusual interest. Figures 12 and 13, "designed to show how important an index of prognathism is represented by the size of the sphenomaxillary angle," may be especially mentioned. It seems a mistake in preparing diagrams like those in figures 3, 5, 6, and 7, which give comparisons between various outlines of individual fossil skulls and those of the skulls of modern races to represent the latter by a single line. Whether this line follows the contour of a selected specimen or whether it is intended to show the mean outline of numerous skulls matters little; the opportunity to give the normal range of individual variation, the one factor of real importance in making such comparisons, is deliberately sacrificed. A new term, "retrognathism," is suggested for the both contracted and retracted condition of the jaws which is often present in cases of microcephaly. In writing of the atrophied teeth that occur in these retrognathous jaws the author uses the word "primitive." In evolutionary language, however, "primitive" usually means resembling the supposed ancestral type. The paper is "to be regarded as a preliminary communication," and it is Dr. Cameron's intention to treat each of its sections separately and more exhaustively in subsequent articles.—G. S. MILLER.

LA CONTROVERSIA SUL FOSSILE DI PILTDOWN E L'ORIGINE DE PHILUM UMANO. By Giuffrida-Ruggeri (V.)—*Monit. Zool. Ital.*, 1919, xxx, 7-8.

In the first part of his paper (pp. 7-12) Professor Giuffrida-Ruggeri reviews the recent phases of the controversy regarding the fossils which have been associated to form the Piltdown Man. The conclusion is: "we prefer the attitude of the American paleontologists who declare

their conviction that fondness for a theory cannot force them to the point of renouncing ordinary zoological and paleontological procedure, according to which the [human] braincase and nasals go to one side, the [simian] canine and mandible go to another, 'each set of fragments to a member of the family which the characters indicate.'" In the second part the evolutionary ideas of Caullery, Bateson, Wood-Jones, Klaatsch and others are briefly outlined with particular reference to their application to the origin of man. As in his previous discussions of the subject, Professor Giuffrida-Ruggeri maintains that there are no sufficient reasons for regarding man as polyphyletic. He points out that no family of mammals is more natural and homogeneous than the Hominidae, and that in the treatment of no other family in which the varieties or species presented similar morphological uniformity would any doubt be expressed with regard to the near genetic relationship of the various forms. It may be added that the recent literature of anthropology in its zoological or systematic aspect contains other examples of like departure from zoological standards.—G. S. MILLER.

ONTOGENY

WIEDERHOLTE FAMILIÄRE HYDROCEPHALIE; ZUGLEICH EIN BEITRAG ZUR FRAGE DER GESCHLECHTSBESTIMMUNG. By Hannes (W.)—*Berl. klin. Wochenschr.*, 1918, LV, 201-203.

The author reports a case of repeated and hereditary hydrocephalus, which at the same time seems to him to speak for progamy (sexuality) of the ovum.

UEBER DIE BEZIEHUNGEN ZWISCHEN ENDOKRINEN SYSTEM UND KONSTITUTION. By Hart (C.)—*Berl. klin. Wochenschr.*, 1917, LIV, No. 45, 1077-80.

From the fact that the endocrine system influences deeply the most important functions of the organism and determines very largely the constitution of the individual, it is self-evident that subnormality and degenerative processes depend primarily on a defective condition of this system. The author believes that many retardations in development, many manifestations of a pathological constitution, and many diseases even, are the expressions of disharmonies in or abnormal condition of the endocrine system. Infantilism is wholly based on such a condition. The author also inclines to the opinion that acquired conditions may through the intermediary of the endocrine secretions pass into hereditary. He believes it possible that the role of the glands of internal secretions in the causation of even such conditions as racial differences in man, may before long be discovered.

EMBRYOLOGY; CHILDHOOD; ADOLESCENCE; DECLINE

L'INDICE BARICO, LA MICROBARIA DELL'ADOLESCENZA, L'ALLOBARIA SESSUALE E PROPOSTA DI CLASSIFICAZIONE. By Giuffrida-Ruggeri (V.)—*Arch. di Fisiol.*, 1918, XVI, fasc. III, 49-62.

The author applies the name of 'Baric Index' to Rohrer's formula of

$\frac{\text{Weight} \times 100}{\text{Stature}}$ and gives divers tables in which the physical development of Turin children of different social conditions is seen and compared to that of Massachusetts, English, Japanese and other school children. The baric index may be considered as a new index of the condition of alimentation—good, sufficient, or defective. As development predominates first in height and then in weight, the result in adolescence is a very low baric index (microbaria). The minimum is not found in the two sexes at the same age, and this diversity may be called the most perfect expression of the sexual dimorphism of adolescence. It is a transitory sexual allobaria, to be distinguished from the permanent sexual allobaria found in adults. In conclusion the limits of microbaria, mesobaria and megabaria are established for the adult and for the two sexes; the data published by Martin and others are used, and give the following scale:

	Male	Female
Microbaria.....	X -1.33	X -1.43
Mesobaria.....	1.34-1.40	1.44-1.50
Megabaria.....	1.41-X	1.51-X
		V. G.-R.

ANTHROPOLOGIE PÉDAGOGIQUE.—Intérêt pédagogique des lois de croissance. By Godin (Paul)—*C. R. Acad. Sc., Paris*, 1918, CLXVII, 558-9.

Natural pedagogy can only be that which is based on a knowledge of the laws and conditions of the child's development. Its object is to facilitate the full and harmonious development as well as functional activity of each organ and assure the liberty of the normal rhythm of these processes. It must give due attention to each individual subject; and its procedure will be facilitated as well as regulated by the "fiche scolaire" which the author advocated in his former communication.

ANTHROPOLOGIE PÉDAGOGIQUE.—Application pratique de la "Fiche scolaire." By Godin (Paul)—*C. R. Acad. Sc. Paris*, 1918, CLXVII, 791-3.

Author gives an example of the practical value of his "fiche" in the case of a scholar who was under his observation for a year and a half.

THE RELATION OF MENTAL TO PHYSICAL DEVELOPMENT. By Pyle (W. H.)—*J. Delinq.*, 1918, III, 210-12.

The author measured the stature and the tapping speed of the right hand of 112 boys 12 years old, among the school children of a Missouri county. These boys were scattered from the first to the eighth grades. The grade in which the children are found may be considered as roughly indicative of their mental development; or at least, it may be assumed that mental development is an important factor in gradation. The results show that, "with a single exception—grade five

to six—height increases from grade to grade.” Without exception muscular speed increased from the first grade to the eighth. The boys in the eighth grade were 11 per cent taller than the boys of the same age in grade one. Their muscular speed was 17 per cent greater. . . . “If the conclusion to which this study points is correct, physical measures should prove helpful in mental diagnosis. But in the study of an individual child, we can not depend upon a comparison of the child with physical age norms, but must consider the physical characteristics of the stock to which the child belongs. For example, an eight-year-old child might be taller than the average of eight-year-old children and still be underdeveloped physically when compared with what an eight-year-old child of his hereditary stock ought to be.”

THE MENTAL AND PHYSICAL DEVELOPMENT OF RURAL CHILDREN.
By Pyle (W. H.) and Collins (P. E.)—*School and Society*, 1918, VIII, 534-39.

A brief report and summary of a study of the mental and physical development of rural children. “The study includes the entire school population, age 8 to 18, of a Missouri county—over 2,000 children in all.” The county was “a typical Missouri county, the inhabitants being native Americans.” The measurements included those of stature, height sitting, weight, lung capacity, strength of grip, and muscular speed; and the results are compared with those obtained by similar methods and instruments on school children in small cities, chiefly in Missouri. They show, in general, the following facts: “There is practically no difference in standing height between country and city children. Taking all the ages together, country boys lack .7 per cent and country girls .2 per cent being as tall as city children. In sitting height the difference, though small, is somewhat greater, the bodies of country boys lacking 1.6 per cent and country girls 1.8 per cent being as long as the bodies of city children. In weight, country boys lack 3 per cent and country girls 1.4 per cent being as heavy as city children. In lung capacity both country boys and girls are appreciably better than city boys and girls, as is true also of grip, especially in the case of country girls. In speed, however, country boys and girls lack 4.4 per cent being as fast as city boys and girls. In vital index (cc. of lung capacity per pound of weight) country boys are approximately 7 per cent and country girls approximately 8 per cent better than city boys and girls respectively.

If the results of all the measures are combined, it is seen that country boys lack .8 per cent being as well developed physically as city boys, while country girls are 1.4 per cent better developed than city girls.

“The sex differences are interesting. In general, the city girl does not show up as well as the city boy. The city does not seem to be as favorable for the physical development of girls as for boys. This fact is especially evident from a comparison of the grip of country and city girls, the country girls being 8 per cent stronger than city girls, while the country boy is but 1.5 per cent stronger than the city boy.”

The results of mental measurements show that the country child of both sexes is considerably behind that of the city. If all the mental tests are combined for all the ages, it is seen that the rural boys have only 72.7 per cent of the city boys' standing, and the rural girls 77.5 per cent of the city girls' standing. But an analysis of the results shows that the differences between the country and city children decrease with age; also that girls approach considerably nearer to city girls in later ages than is the case with boys. Country girls excel country boys at every age.

UNTERSCHIEDE IM WACHSTUM BEI SCHULKINDERN UND JUNGEN LEUTEN VON VERSCHIEDENER KONSTITUTION UND AUS VERSCHIEDENEN BEVÖLKERUNGSSCHICHTEN. By Schlesinger (E.).—*Deutsche med. Wochenschr.*, 1917, XLIII, No. 51, 1607-08.

Author's abstract of a report on the measurements of 10,000 school and high school boys, ranging from 6 to 20 years of age, from Strassburg in Alsace; with a critical discussion of the work by H. Griesbach.

The subjects were grouped primarily by the state of development and the "constitution" of the individuals, which the author believes gave the possibility to study the conditions of growth in the well-developed, average, and the ill-developed classes of subjects. The results indicated four *growth-periods*, namely: (1) A fairly lively period of growth from the 6th year to the 9th year, with a preponderance of development in length over that in weight and circumference of chest; (2) a short but strongly pronounced period of harmonious and slow growth from the 9th to the 10th year; (3) a period of very lively gain up to the 15th or 16th year, with a maximum of yearly augmentation at about 14, so far as stature is concerned, and at about 15 in weight; (4) and a period of slow increase in stature together with a livelier gain in weight thereafter. The under-developed children showed various irregularities in these respects, but their growth is especially characterized through prolonged periods of stagnation. The volume of the thorax was found to stand in closer correlation to the increase in weight than to that in stature.

H. Griesbach criticises the work because of the uncertainty of the classification; on account of the heterogeneity of the material; and because no effort was made to separate the subjects into country and city boys, into those from the low- and those from the highlands, and on the basis of the occupation of the parents. Another disadvantage is the lack of inclusion of female children. He further calls attention to a recent report of E. Burk (Giessen, 1916) on 12,220 Hessian children. The growth curves obtained by Burk differ in various respects from those of Schlesinger.

HEREDITY; DEMOGRAPHY; VITAL STATISTICS; EUGENICS

THE NEW HOPE IN HEREDITY. By Fischer (Martin H.).—*The Unpopular Rev.*, 1919, XI, Apr.-June, 320-339.

The author supports the well known inheritance and eugenic theories

of Casper Redfield. The Lamarckian principle and that of Mendelian inheritance are not mutually exclusive. "The two views can, without compromise, go hand in hand; and for the thinker in biological human problems, it is only necessary in any specific instance to see to it that proper weight is given to each of the two elements, and to keep clearly in mind what each idea, if put to work, can accomplish. . . . Though the family of our neighbor may begin with the advantage of richer ground, ours may, through better effort, equal and excel his." The lesson, if a superior progeny is to be assured, is not merely to marry late and beget children later still; it is "to work and work without ceasing—to use to the full the faculties of body, mind and soul."

LA DEPOPULATION DANS LE LOT-ET-GARONNE [FRANCE]. By Capot-Rey (R.).—*Ann. Geogr.*, 1919, XXVIII, No. 151, 64-70.

The subject of a chronic, progressive depopulation in various parts of France has never received as earnest attention by the scientific men of that country as during the last few years, since the further serious aggravation of the problem by the war. The article here referred to is an exceptionally good contribution to the study of the causes of the phenomenon among the Gascons. The main and determining condition of the evil in the region in question, as elsewhere in France, is the small number of births. The causes of this are deeply rooted habits and morals of the people. The farmer will not have a larger family, to prevent division of property; the progeny tend to desert the country for the cities; and there is a noticeable moral as well as physical enfeeblement. To remedy matters will not be easy. Efforts must be largely in the direction of wholesome, radical change in the mental attitude of the peasant.

THE MENACE OF THE BIRTH-RATE. By Berry (R. J. A.).—Address of the Retiring President of the Victoria Branch of the British Medical Association. *Med. J. Austral.*, Dec. 15, 1917, repr. 15 pp.

"The decline in the birth-rate of each of the abler and more valuable sections of the community, and the increase in numbers of the actually feeble-minded and less effective and profitable citizens may be—as it probably was in Rome and Greece—the actual cause of the downfall of any civilization where these phenomena are observed. That this decline is taking place in almost every part of the British Empire and was being accelerated by the war is indisputable. The handwriting is on the wall. The endowment of racially fit parentage is the great eugenic problem which in this century faces the chief European nations, and one can only express the hope that it may not be given to Germany alone to supply the solution." The remedies are, in the first place, strong measures for the repression of the advertisement and sale of abortifacients and preventives; but above all the child, particularly among the better classes, must once more be made a welcome possibility.

REPORT ON THE PHYSICAL WELFARE OF MOTHERS AND CHILDREN [IN THE BRITISH ISLES]. Pub. by The Carnegie United Kingdom Trust, Vols. I-III, imp. 8°, Liverpool, 1917-18.

The Carnegie United Kingdom Trustees have taken steps to secure comprehensive reports on the existing provisions for promoting the Physical Welfare of Mothers and Young Children, because the rate of infantile mortality, with its predominant causes, and the health-supervision of children from infancy to the age of admission to school, are—in their opinion—among the most important questions of the present day relating to the well-being of the people.

The reports have been compiled by E. W. Hope, Esq., M.D., D.Sc., Medical Officer of Health for Liverpool; by Miss Janet M. Campbell, M.D., M.S., one of the Senior Medical Officers of the Board of Education, in respect of England and Wales; by W. Leslie Mackenzie, Esq., M.D., LL.D., F.R.C.P.E., F.R.S.E., Medical Member of the Local Government Board for Scotland, so far as Scotland is concerned; and by E. Coey Bigger, Esq., M.D., M.Ch., Medical Commissioner of the Local Government Board for Ireland, in respect to Ireland.

The three large volumes thus far published are those by Drs. Hope, Campbell, and Mackenzie. They bring in excellent form a wealth of data, comments and recommendations, which cannot be even briefly abstracted in this place, but which have for their object the promotion, by all legitimate and scientific means, of the physical welfare of the mothers and children of England, Wales and Scotland. The whole subject is mainly, of course, sociological and medical, but has also a more or less direct and important bearing on anthropology; and the reports enclose many demographic data which it would be difficult to find in other sources. The local details are naturally of less interest outside of the countries considered; but the volumes will be indispensable for study and consultation to all Bureaus and Institutions that deal with the very important subjects to which they are devoted.

The first volume contains, (1) A General Report of the Subject; (2) Statistical Charts and Diagrams (3) Abstracts of Legislation; (4) Epitomes of Local Reports (for England and Wales); Volume II deals with (1) Midwives and Midwifery; (2) Voluntary Work for Infant Welfare; (3) Play Centres and Playgrounds.

THE ENGLISH BIRTH-RATE.—*British Med. J.*, March 29, 1919. 387-88.

"The fact that in the last quarter of 1918 the civilian deaths in England and Wales exceeded the births by 79,443 will no doubt stimulate public interest in the proceedings of the National Birth-rate Commission. Sir Rider Haggard, who was the first witness on March 24, while obviously sceptical as to the feasibility of schemes—much favoured by the wealthier class of urban residents—to people the rural districts of this country with demobilized soldiers rearing large and healthy families on the produce of small holdings, thought that much

might be done to maintain the supply of infants by encouraging emigration. Dr. C. Killick Millard, who followed Sir Rider Haggard, contested the view that a man ought to be accused of failing in his duty if he declined to have children merely for the sake of emigrating them to the antipodes. Dr. Millard came forward as a whole-hearted supporter of birth-control. In his opinion, the success of the League of Nations would deprive the advocates of unlimited procreation of their most effective argument—the need for large supplies of cannon fodder. Apart from the military argument, the chief objection to birth control as at present practised was, he considered, its dysgenic effect, the C 3 classes adding to the population in a larger proportion than the A 1 group. Were all classes equally to practise birth control the limitation would cease to operate selectively; indeed, it might be possible to improve the race by a suitable propaganda tending to the accentuation of birth control amongst tainted stocks. We shall no doubt be accused of frivolity when we say that the proceedings of the Birth-rate Commission, the discussions of the bishops at the Pan-Anglican Conference, and most of the literature dealing with the subject recall to us the combat between the lion and the unicorn for the crown which, as the White King explained to Alice, was *his* crown. There is not, we conceive, the slightest reason to expect that the provision of small holdings in England or cheap passages to Canada, the pronouncements of bishops, or even the aphorisms of eminent physicians, will affect the birth-rate in the second place of decimals. Whether the decline of the birth-rate is the unmixed blessing which members of the Malthusian League deem it or the unmixed evil which various divines assert it to be, or whether, as Dr. Millard holds, it is only an evil in so far as it is dysgenically selective, it will not be arrested until an equilibrium has been established between the available income per head and the standard of life demanded by each social class."

THE MORTALITY OF CHILDHOOD. By Dublin (Louis I.)—*Quart. Pub. Am. Stat. Ass.*, Mich., 1918, repr. 8vo., 25 pp.

Excluding infants, there are few contributions of value in American vital statistics on the mortality of childhood; the pre-school and school years have in this respect been virtually overlooked. The available data show two outstanding facts: Childhood is ushered in with the highest mortality rate, and it closes with the lowest rate of any divisional period of life. The causes of death affecting children may be grouped under six heads, namely: (1) Causes indicative of prematurity, of congenital debility or of injury at birth. (2) Diseases and abnormal conditions of the digestive tract. (3) Diseases and abnormal conditions of the respiratory system. (4) The principal epidemic diseases of childhood. (5) Accidents and injuries. (6) Miscellaneous infectious and organic diseases.

The author sees a need and opportunity for a further reduction of mortality in childhood in this country, and believes that much addi-

tional life saving can be accomplished. As one of the first steps, however, we must seek to improve our sources of information on child life. Accurate census returns of the child population of the United States, together with improved birth registration, the extension and refinement of death registration, and the critical statistical analysis of child mortality, are particularly desirable. They will place data at our disposal for practical service in the saving of child life, not only in infancy but at the ages of childhood as well.

MORTALITY STATISTICS OF INSURED WAGE-EARNERS AND THEIR FAMILIES. By Dublin (Louis I.), with the collaboration of Edwin W. Kopf and George H. Van Buren. 8vo, Metropolitan Life Insurance Co., New York, 1919, 397 pp.

This valuable contribution to the morbidity of the industrial classes is based on experience of the Metropolitan Life Insurance Company in the United States and Canada, from 1911 to 1916. The data relate to no less than 635,000 deaths of policy holders of the Company; and the volume is "an analysis of the material and is submitted as a contribution by the Company to the public health movements in the United States and Canada"; it is a "contribution to the facts on the vitality of American wage earners." The completeness and accuracy of the data are superior to those of the Census and other sources, and as they are arranged by color, sex and age periods, they become of considerable value to anthropology as well as to medicine.

It is impossible to show even a part of the many interesting facts shown by this volume, which in general is on a decidedly higher scholarly level than the average statistical publication of this nature. Its seventeen chapters and four appendices deal with every current cause of death in the regions it covers. They bring out many facts of racial interest, particularly in the way of differences between the white and the negro; and many other facts showing the incident of special diseases according to sex and life period. It is hoped that a summary of the facts may be presented later in this Journal.

A copy of the volume, it is understood, can be obtained by qualified workers on request, by applying to the Statistical Bureau of the Metropolitan Life Insurance Company, New York City.

CONSERVATION OF CHILD LIFE. By Gallivan (W. J.)—*Amer. J. Publ. Health*, 1918, viii, No. 1, 37-39.

Always a pioneer in matters pertaining to health, Massachusetts, under the leadership of Dr. Allan J. McLaughlin, State Commissioner of Health, has undertaken the work of child conservation.

The commonwealth has been divided into eight health districts. Each district is presided over by a full-time district health officer. To each district has been assigned a nurse, who will be assisted by a corps of volunteer aids. This machinery will be directed by a Committee on Conservation of Child Life appointed by the State Commissioner of Health.

It is planned to make a survey of every city and town, every village and hamlet in the state. This survey will include an exhaustive study of the mortality and morbidity statistics of children under the age of five years, the generally accepted period of school age, and a compilation of the agencies in each area which provide continuous, competent medical care. This survey will disclose the conditions.

The remedy for the conditions will be applied by the Committee on Child Conservation who look upon local boards of health as their strong right arm in this venture.

A MATERNITY AND INFANT WELFARE PROGRAM FOR THE UNITED STATES. By Larson (J. H.)—*Am. J. Pub. Health*, Boston, July, 1918, 482-87.

A program of this kind should include: (1) Prenatal nursing and maternity clinic service coordinated with the highest standard of obstetrical service obtainable. (2) Nursing care for mother and child during confinement. (3) Report of every birth to the proper authorities. (4) Home visiting and clinical supervision by physician and nurse of mother and child after confinement. (5) Registering the mother and child at a babies' milk station or clinic with home visiting when necessary until the child is two years of age. (6) Nursing and medical supervision of child during its pre-school age. (7) Making available to all children of school age physical examination and medical supervision. (8) A strengthening, rather than relaxation, of the child labor laws, and demand of a definite mental and physical standard with satisfactorily completed school work before working papers are issued.

PRACTICAL USES OF VITAL STATISTICS. By Wynne (Shirley W.)—*Am. J. Pub. Health*, 1918, VII, No. 2, 138-145.

Of indirect nevertheless real interest to physical anthropology. The extent of practical uses of vital statistics is shown to be astonishingly great. The enumeration of these uses is preceded by a historical sketch from which we learn that vital statistics "were called into being by the need of the practical information that they give, and their development into a separate science must be attributed to the increasing demand for data of the lives of the people for commercial, legal or other practical purposes." While the greatest strides in the advance of vital statistics as a science have been made in recent years, their origin may be traced to centuries before Christ. "Indeed, Herodotus tells us of a census of Egypt taken about 3050 B.C. for the purpose of making arrangements for the construction of the Pyramids. . . . The Bible tells us that Moses counted the tribes of Israel to determine their fighting strength and that David, about 1018 B.C., took a census for the same purpose. . . . There is a record of a census taken in China about 1200 B.C., when data of the provinces was collected by Uking. . . . The first censuses made at regular intervals, of which we have a record, were taken in Rome after Servius Tullius.

. . . During the Middle Ages, enumerations were made from time to time, always with some specific purpose in view, which usually had to do with determining the fighting strength or the wealth of the nation taking the census. . . . Sweden, about the middle of the seventeenth century, made it compulsory for the clergy to record not only the births, marriages and deaths, but also the populations of their parishes. . . . In Quebec a periodical census was established in 1665 and was continued until 1754. This was probably the first modern census. . . . The decennial census, which is an American institution, was brought into being by the provision in the Constitution for representation in Congress. The first one was taken in 1790 and was probably the first census in the broad sense of the word."

MAN'S VARIATION: GENERAL

THE CAUSES OF HUMAN VARIABILITY. By Fisher (R. A.)—*Eug. Rev.*, 1919, x, 213–220.

A mathematical dissertation, the conclusions of which are thus summed up:

(1) "The facts of Biometry do not contradict, but in many ways positively support the theory of cumulative Mendelian factors. (2) If this theory is correct a sufficient knowledge of the correlation coefficients for any one feature, between different pairs of relatives, would enable us to analyze completely and estimate numerically the percentage of variance due to heritable factors. (3) A provisional examination of the existing data shows it to be unlikely that more than 5 per cent of the variance of the physical measurements of man is due to non-heritable causes."

VARIATION; SKELETON; TEETH

THE HUMAN SKELETON—An Interpretation. By Walter (Herbert Eugene)—12mo, New York, 1918, xv—214. (The Macmillan Co., \$1.75.)

The object of the author of the little book was "to make plain, in some measure at least, that the human skeleton, so often associated unthinkingly with the gruesome symbolism of death, is actually a very wonderful and animated piece of architecture, full of beauty and inspiration for one who looks upon it with a seeing eye and considers its age-long evolution with a comprehending and sympathetic mind." Besides which, every person has a skeleton of his own, and to "become better acquainted with it is a source of intellectual delight and satisfaction." Also there is a good utilitarian reason for understanding more about one's own structure and mechanism.

The work is largely of an elementary nature, and while bringing out many nice points, it is also regrettably in many respects subject of considerable improvement. In some places the author, a biologist, has seemingly forgotten that he was dealing with the human skeleton, and in others that the book was not for those who could not benefit

by technical terms. Moreover, there are some actual errors. As to the illustrations, they make one sigh for the clearness and perfection of similar illustrations of the French and other continental books on the skeleton.

TWO REMARKABLE SKULLS FROM NEW HEBRIDES. By Cameron (John)—*Trans. Nova Scot. Inst. Sci.*, 1919, XIV, 408-432, 12 fig.

The skulls came from South Malekula in the New Hebrides, Melanesia, and belonged to two adult males. Their faces are covered with a mold, to approximate facial features in life. Both are artificially deformed in an Aymara-like fashion, which accentuates their length and narrowness; it vitiates, however, the value of their measurements and outlines for the purposes of racial comparisons. The cranial capacity gives respectively 1368 and 1395 cc. The denture shows a rather superior type, very uncommon in Melanesians.

NOTES ON CERTAIN HUMAN CRANIA IN THE QUEENSLAND MUSEUM. By Longman (Heber A.)—*Mem. Queensland Mus.*, 1918, VI, 1-4, 5 pl.

Brief notes on a male Australian skull showing U-shaped palate ("palate with approximately parallel sides"); on a male Queensland skull with very asymmetric (encroached upon) foramen magnum and an unusual apparent breadth of the first upper molars; on a microcephalic (cr. cap. 980 cc.), thick-walled, female skull from North Queensland; on brachycephalic skulls from the Fly River district, Papua; on an immature cranium from latter locality with a large bregma bone; and on a mandible from an unknown locality which "has on each side a deep alveolus for the accommodation of a fourth molar," and presents otherwise a primitive type (broad ascending ramus, small prominence of chin, dental arch square in front).

EIN FALL VON FISSURA STERNALIS CONGENITA COMPLETA SIMPLEX. By Elias (H.)—*Wien. klin. Wochenschr.*, 1918, XXXI, 98-100.

A married woman of 33, of Vienna, who applied for dispensary treatment for incipient tuberculosis of the lungs, presented a deep medio-sternal depression, which with the help of an X-ray picture was found to be due to a complete fission of the sternum into two lateral halves. Each of the parts appeared to be fairly well developed and was completely ossified, though still showing the original subdivisions. The anomaly caused no special difficulties to the patient, though the furrow was formerly even more marked than at present. The patient had five children, none of whom showed a similar abnormality, and she knew of nothing similar in the rest of the family. Cases of this nature are very rare, only a few having so far been reported—the author gives three references. The morphological significance of the anomaly is not considered.

THE ONTOGENY AND PHYLOGENY OF THE STERNUM. By Hanson (Frank Blair)—(MS.)

There are extant in the literature three conflicting theories of sternal

origin, and it is generally supposed that the Amniote and Ichthyopsidan sterna are not homologous. It is shown that the sternum throughout the vertebrates is more closely allied to the shoulder girdle than to the ribs; and stages are described in the embryos of a number of mammals, cat, rat, mouse, pig and man, in which the sternal bars are well established structures prior to their union with the ribs, which fact overthrows Ruge's theory of a costal origin for the sternum. The presternum is intimately associated with the coracoids in all classes of vertebrates through the Monotremes. In early embryos of the mouse and man, a continuous mesenchymatous girdle, comparable to the pectoral girdle of the shark, is formed, out of which arises the shoulder girdle and manubrium. Therefore, the anterior element of the sternum has its origin in common with the shoulder girdle; and in the embryo or throughout life is in intimate relation to the coracoids. The sternal bands are derivatives of the anterior, median basic structure, and may be secondarily, but never genetically associated with the ribs. The sternum is an homologous structure throughout all groups of vertebrates, and occurs in forms ranging from the shark, *Hexanchus*, up to man.—F. B. H.

ZUR ENTSTEHUNG DER TORSION DES HUMERUS. By Mollison (Th.)
—*Muench. med. Wochenschr.*, 1917, LXIV, No. 30, 984.

Demonstration of a model that shows the relation of the secondary torsion of the humerus with the antero-posterior thoracic flattening developed in the orthograde primates through the assumption of the erect posture. The consequent displacement of the scapula gave rise to outward pronation of the forearm, which condition became connected with the secondary torsion of the humerus.

NOTES

The 1920 meeting of the American Association of Anatomists will be held during the Easter week of that year at the United States National Museum in Washington. The meeting promises to be one of the most important ever held by the association.

Dirección de Antropologia, Mexico.—Since the first of the year the “*Dirección de Estudios Arqueológicos y Etnográficos*” of the Department of Agriculture and Promotion, in the city of Mexico, under Manuel Gamio, is known as the “*Dirección de Antropologia*.” A copy of a *Boletín Extraordinario de la Secretaría de Agricultura y Fomento* (Mexico, 1919, 116–120) contains an article by Sr. Gamio which outlines in brief the origin, program and tendencies of the “*Dirección*.”

The establishment is announced, in Rome, of the *Società Italiana Di Genetica E Di Eugenica*, the scope of which is to “promote and assist all research and all movements which may tend to advance knowledge of the laws of heredity, and amelioration of the race.” The executive committee of the Society is composed of fifteen men, representatives of the biological, medical, and sociological sciences. The present address of the Society is Villa Umberto 1, Rome, Italy.

The “*École Libre d'Anthropologie*” has been established at Liège, Belgium. Dr. Charles Fraipont has been named Professor of Physical Anthropology at the school.

According to information obtained from German anthropological periodicals which have just reached this country, the editorship of Schwalbe's *Zeitschrift für Morphologie und Anthropologie* has, since January 1, 1917, been assumed by Professor Eugen Fischer; while the *Archiv für Anthropologie*, formerly edited by Johannes Ranke and Georg Thilenius, is since Ranke's death edited alone by Thilenius.

Professor G. Elliot Smith, the well-known English anthropologist, and since 1910 Professor of Anatomy in the University of Manchester,

has been appointed to the chair of Anatomy at the University College, London.

Dr. M. Curtis Farabee, who served as one of the ethnographers with the United States Peace Mission in Paris, has returned to his post at the University Museum, Philadelphia. While in Paris he was made a corresponding member of the Paris Anthropological Society and of the Association for the Teaching of Anthropological Sciences.

Dr. Aleš Hrdlička has been made honorary member of the "Association Liégoise pour l'Étude et l'Enseignement des Sciences Anthropologiques," at Liège, Belgium.

The death has been announced, in his seventieth year, of Dr. Karl v. Bardeleben, Professor of Anatomy at the University of Jena. Professor v. Bardeleben, one of the foremost anatomists of Germany, was much interested in physical anthropology, to which he also contributed in an important measure by some of his writings. Outside of Germany he was perhaps best known as the Editor of the *Anatomischer Anzeiger*, of the *Verhandlungen der Anatomischen Gesellschaft*, and of the comprehensive and useful *Handbuch der Anatomie des Menschen* (8 vols., Jena, 1896-). He was the author of a textbook on Human Anatomy, *Atlas of Topographical Anatomy*, *Contributions to the Anatomy of the Spine*, and of a memoir on the *Laws of Bone Development*, besides that of many articles in various anatomical journals. With the recent deaths of Schwalbe, Ranke, Klaatsch, and now v. Bardeleben, the ranks of the veteran German anatomists-anthropologists are sadly depleted.

Professor Ernst Haeckel ✕.—JENA, GERMANY, Aug. 9.—Ernst Haeckel, Professor of Zoology in the University of Jena for nearly fifty years, and famous throughout the world for his research work supporting the theory of evolution, died here today.

Ernst Haeckel, the most famous of the German exponents of the doctrine of evolution, was born at Potsdam on Feb. 16, 1834. When eighteen years of age he entered as a student at the Bavarian University of Würzburg and at once devoted himself to natural science. A lengthened period of study at Berlin and Vienna succeeded, and Haeckel, like Huxley, believing that he would do best if he devoted himself to the medical profession, settled in Berlin as a physician.

There he fell under the influence of Johannes Muller, the physiologist, and at his instigation devoted himself to the study of the lower forms of marine animals.

When Professor Haeckel was only 25 he traveled extensively in the Mediterranean and began that long series of investigations which have become identified with his name. On his return to Germany he accepted the Professorship of Zoology at the University of Jena, a position which he held until shortly before his death. Professor Haeckel all his life was a traveler, but his travels were always undertaken with the object of enlarging his knowledge in his own special branches of study.

As early as 1863 he proclaimed himself a convinced adherent of the Darwinian theory, and at once entered the lists to do battle in the cause of which he was the first champion in Germany. When only 33 he made his first contribution to Darwinism, a treatise entitled "General Morphology." The importance of his labors, however, in this and in his other earlier books lay not so much in the brilliant powers of observation which he displayed as in the dominating trait of speculativeness which enabled him to accept without fear unproved conclusions provided they recommended themselves to him as logical.

The doctrine which became speedily associated with his name was that known as the "Biogenetic Law." This law asserts that the organism recapitulates in the short and rapid course of its individual development the most important of those form modifications undergone by the successive ancestors of the species in the course of their long and slow historic evolution, and the casual relation of the two histories is to be explained in terms of heredity and adaptation.

In subsequent works he presented the results of the extraordinary activity of the study of embryology which followed the publication of the "Origin of Species." His attempts to collect the entire living world under one point of view, and his courageous way of openly claiming that which has since been scientifically recognized, made him many enemies, but brought to his standard still more numerous friends who enthusiastically sounded his praises, and supplied him with the necessary funds for continuing his investigations. He was regarded by his admirers as next to Darwin, the most eminent of Darwinians.

In his "World-Problems" he went much further than Darwin dared to go, and has given us a program of the world's origin, which

wholly eliminates all elements of design in the scheme of things, with a vigor almost unscientific in its harshness. He rejects the idea of personal immortality as ludicrous; and as for a moral order in the world, it does not exist. But his books teem with passages in which he recognizes the beauty of Nature, and in which mankind is urged to devote itself to the beautiful, the good and the true.

Professor Haeckel's best known works, in addition to those already mentioned are: "The History of Natural Creation; The Genesis and the Genealogical Tree of the Human Race;" "Anthropogeny, and the History of Human Development;" "Monism, the Religious Confessions of a Naturalist," "Our Present Knowledge of the Origin of Man," and "Indian Travel Sketches." Professor Haeckel also contributed to the remarkable series of reports which embodied the scientific results of the Challenger expedition.

His religion was called "Monism," a term he invented to cover his belief in the essential unity of organic and inorganic matter. Some of these views he put in his most widely-read book, "The Riddle of the Universe." This had a tremendous sale all over the world.

Professor Haeckel did not differ widely from the official German view of the world war. He cried "Down with England at any price," and asserted that his knowledge of England for half a century had taught him that "England is rightly called the destroyer of peoples." He was one of those who demanded the retirement of Chancellor von Bethmann-Hollweg in 1916.

On his last birthday he sent an engraved card to his friends stating that he expected to die before next Winter. He then expressed the hope that "soon after the end of this mad, culture-destroying war, our longed for German peace will be firmly established on a scientific basis."—*N. Y. Times*, Aug. 10, 1919.

Dr. Joseph Deniker✕.—*Man* of 1918 (xviii, No. 39, 65-67), brings a good biographical notice together with an excellent portrait of Dr. Deniker, the author of "The Races of Man," from the pen of Arthur Keith and Alfred C. Haddon. We see from this that Dr. Deniker, who died March 18, 1918, was born in 1852 in Astrakan, Russia; that he studied in Petrograd, at the University of Paris, and under Broca, becoming eventually associated with the École d'Anthropologie in Paris and the chief librarian of the Museum d'Histoire Naturelle in the same city; and that besides his very useful work on the Races of

Man he made valuable contributions to our knowledge of the anthropoid apes, of the Fuegians, and of many Asiatic and African tribes. In 1904 he delivered the Huxley Lecture before the Royal Anthropological Institute and was awarded the Huxley medal.

According to recent information it appears that Dr. Deniker has for some time before his death been engaged on a new edition of his "Races of Man." A prompt publication of such an edition is very desirable.

Ernst Gaupp (L. Gräper, *Berl. klin. Wochenschr.*, 1917, 125-28). With the recently received German medical periodicals for the period of 1917-18, there comes also an obituary, together with a bibliography, of still another German anatomist who in no small measure contributed also to physical anthropology, namely, Ernst Gaupp, professor of anatomy at the Breslau University.

Professor Gaupp died of heart trouble, in the midst of strenuous military and other activities, in the fifty-first year of his life and just before receiving the honor of being called to the professorship of anatomy at the Berlin University. His long and intensive research activities were devoted in the main to comparative and human osteology, and a large number of his publications in these lines are of more or less direct value to anthropology. The principal ones are as follows:

Ueber die Ala temporalis des Säugerschädels und die Regio orbitalis einiger anderer Wirbeltierschädel. *Anat. Hefte*, 1902, xix.

(with C. Hasse)—Die Formen des menschlichen Körpers und die Formänderungen bei der Atmung. Jena, 1892.

Zum Verständnis des Säuger- und Menschenschädels. *Korr. Bl. D. Anthropol. Ges.*, 1903, xxxiv, Nr. 12

Neue Deutungen auf dem Gebiete der Lehre vom Säugertierschädel. *Anat. Anz.*, 1905, xxvii.

Die Entwicklung des Kopfskelettes. Hertwig's Handb. Entwicklungslehre, 1905, iii, Abt. ii.

Die Nicht-Homologie des Unterkiefers in der Wirbeltierreihe. *Verh. Anat. Ges.*, 19 Vers., 1905; also, C. R. Assoc. Anatom., vii Session, Genève, 1905.

Ueber allgemeine und spezielle Fragen aus der Lehre vom Kopfskelett der Wirbeltiere. *Vehr. Anat. Ges.*, 20 Vers., 1906, Rostock.

Ueber die Kopfgelenke der Säuger und des Menschen in morphologischer und funktioneller Beziehung. *Verh. Anat. Ges.*, 22 Vers., Berlin, 1908.

Ueber die Rechtshändigkeit des Menschen. *Sml. anat. Vortr.*, 1909, H. 1.

Die Gehörknöchelchen- und Unterkieferfrage. XVI. Congr. Intern. Med., Budapest, 1909.

Die normalen Asymmetrien des menschliche Körpers. *Sml. anat. Vortr.*, 1909, H. 4.

Das Lacrimale des Menschen und der Säuger und seine morphologische Bedeutung. *Anat. Anz.*, 1910, xxxvi.

Erwiderung auf den Aufsatz von H. Fuchs: "Ueber das Pterygoid, Palatinum und Parasphenoid der Quadrupeden, insbesondere der Reptilien und Säugetiere, nebst einigen Betrachtungen über die Beziehungen zwischen Nerven und Skeletteilen." *Anat. Anz.*, 1910, xxxvii.

Säugerpterygoid und Echidnapterygoid, nebst Bemerkungen über das Säuger-Palatinum und den Processus basipterygoideus. *Anat. Hefte*, 1910, xlii.

Beiträge zur Kenntnis des Unterkiefers der Wirbeltiere. I., II., III., *Anat. Anz.*, 1911, xxxix.

Nachträgliche Bemerkungen zur Kenntnis des Unterkiefers der Wirbeltiere, ins. der Amphibien. *Anat. Beitr.*, 1912, xl.

Die Verwandtschaftsverhältnisse der Säuger, vom Standpunkt der Schädelmorphologie aus erörtert. Verh. d. VIII. intern. Zool.-Kongr., Graz, 1910 (1912).

Das Schläfenbein und seine Darstellung im anatomischen, besonders im osteologischen Unterricht. *Arch. f. Anat. Abt.*, Jahrg. 1915.

The August, 1916, number of the *Zeitschrift für Morphologie und Anthropologie*, which announces the death of Gustav Schwalbe, brings also a notice of the death of the well-known Amsterdam anthropologist Dr. J. Sasse.

As this number is passing through press, an announcement comes of the death of still another European anthropologist of note, namely, Gustaf Retzius, the son of Anders Retzius. He died in Stockholm, on July 22, in his 77th year of age. His works in biology as well as anthropology are monumental.

Correction—In the article on "Racial Characteristics of Spleen Weight in Man," published in the preceding number, in the third line above the "Discussion" the word "Negroes" should be Whites.

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HISTORIA DE ANTROPOLOGÍA FÍSICA EN MÉXICO

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I

Aprovechando noticias oficiales esparcidas en varias publicaciones, preguntando a personas que intervinieron en algunos hechos y que por su posición en la administración pública se informaron de tales o cuales asuntos, y recordando acontecimientos en los cuales yo intervine, he podido coleccionar las *Notas* que hoy presento.

Hasta donde me ha sido dable he subsanado esos inconvenientes; no obstante ello, creo que más de un error o apreciación equivocada debe haber en este escrito. Omisiones más o menos importantes, de hecho las hay; pero no ha estado en mi mano evitarlas.

II

La "Comision científica Franco-Mexicana" que por iniciativa del Coronel de Ingenieros, M. L. Doutrelaine, se organizó en México de orden del General Bazain el año 1864, entre las diez secciones en que se dividió formó la llamada "de Medicina," comprendiendo en ella a la Cirugía, Higiene, Medicina Veterinaria, Estadística Médica, Materia médica y *Antropología*.

La Sección de Medicina inició sus trabajos el 19 de Abril del año 1864, subsistiendo hasta la fecha con el nombre de "Academia Nacional de Medicina."

La palabra Antropología no se tomó en esa asociación en su sentido lato sino en el circunscrito de *Antropología física o Somatología*, y así vemos a algunos de sus miembros, los Doctores León Coindet,

y D. Jourdanet, hacer observaciones somato-métricas que en la "Gazeta Médica" (1864) vieron la luz pública.

La "Commission Scientifique du Mexique" creada por decreto del Emperador Napoleón III, de Francia, fecha 27 de Febrero de 1864, incluyó en su programa las investigaciones antropométricas y la recolección de restos humanos, antiguos y modernos, de los mexicanos.

En las Instructions Sommaires que el Comité de ciencias naturales y médicas presentó, y aprobó la Comisión, hay unas referentes a la Antropología que redactó el renombrado profesor de Quatrefages.¹

Tanto los miembros viajeros de esa Comisión, como los médicos del ejército expedicionario francés y algunos Jefes del mismo, ayudados por particulares, hicieron mediciones de indios, criollos y mestizos de México. Recogieron también restos esqueléticos que enviaron a Francia; así se enriqueció la colección de la Sociedad de Antropología de París.

Inició los trabajos Antropométricos el Dr. Coindet con un estudio acerca de las dimensiones del torax en los indios, publicado en la "Gazeta Médica de México" y en esta vía le siguió el Dr. Jourdanet.

A su vez M. D. Charnay y T. Maller fotografiaban y medían a los indios, y los Drs. Fuzier, G. Jacob y Liberman recogían cráneos antiguos, lo mismo que M. Lami, el Coronel Doutrelaine y el presbítero D. Agustín Fischer.

Los resultados de esta labor se conocieron en parte hasta el año 1890, en la ojo por desgracia no terminada obra del Dr. E. T. Hamy, intitulada "L'Anthropologie du Mexique."

Subsistió por varios años en la Academia de Medicina de México la sección de Antropología y en una de las modificaciones a su reglamento fué suprimida, quizá por no haber con quien llenarla.

Indirectamente hicieron labor antropométrica algunos médicos mexicanos, principalmente los parteros. Por el año 1869 comenzaron a ocuparse de pelvimetría femenina los Doctores Julio Clement y Juan María Rodríguez, atrayendo a estas mismas investigaciones a algunos de sus discípulos, aunque sin marcarles técnica especial ni menos darles una verdadera enseñanza antropométrica. En estos estudios que amparó y dirigió el Sr. Dr. Rodríguez se llegó a conclusiones más o menos fundadas, no faltando quienes manifestasen su inconformidad con ellas y aun las refutaran.

En 1887 los doctores M. T. González y A. R. Olivares rechazaron

¹ Archives de la Commission Scientifique du Mexique. Vol. 1°, págs 21 a 27, París, MDCCCLXV.

la doctrina del Dr. Rodriguez referente a la *pelvis mexicana acorazada* y a otros puntos de pelvimetría obstétrica.

En 1911 el Dr. Juan Duque de Estrada reconsideró el mismo asunto publicando un notable estudio pelvimétrico en el que se ocupa de las deformaciones pélvicas en México y refuta las teorías y conclusiones del Dr. Rodriguez y de algunos de sus discípulos, a la vez que señala, por vez primera, una forma especial de pelvis femenina anormal que hasta la fecha solamente en México, según él afirma, se ha encontrado.

El Sr. Dr. Fernando Zárraga se consagró también en alguna época a la pelvimetría, y a su laboriosidad se deben unas cuantas mediciones pélvicas a la vez que aparatos e instrumentos para ejecutarlas.

En todos estos trabajos se nota la falta de una de las más imprescindibles condiciones para que ellos sean fructuosos, y es el no usar en los mismos técnica uniforme e instrumentos apropiados, según lo preceptúan las clásicas instrucciones de Broca y sus aventajados continuadores.

Conociendo el que esto escribe la necesidad e importancia de uniformar la técnica y usar los instrumentos convenientes y deseando definir, antropométricamente, la verdadera forma y dimensiones de la *pelvis normal* de la mujer mexicana, apreciando los datos de *raza y mestizaje*, ha formulado unas "Instrucciones" basadas en las doctrinas clásicas, hoy aceptadas, y guiándose por ellas se ocupa en medir pelvis esqueléticas femeninas *normales* cuyos caracteres dará a conocer próximamente.

El entusiasmo que despertara, en México, la Comisión científica franco-mexicana y la Academia de Medicina, por los estudios Antropológicos, bien pronto desapareció, y aún el especial que por la pelvimetría obstétrica sostuvo el Señor Dr. Rodriguez, concluyó con su muerte.

III

Algo de afición a estas investigaciones conservó el Sr. Dr. D. Jesús Sánchez, director del Museo Nacional de México, y a su empeño se debió que el año 1887 se creara en ese Establecimiento una sección de Antropología física en la que se exhibía un reducido número de cráneos indios precolombinos y una colección de vaciados en yeso, representando deformaciones étnicas y patológicas, que se obtuvo del bien conocido comerciante Mr. Ward, de Rochester, E. U. A. Tomó a su cargo esta Sección del Museo el Sr. Dr. Francisco Martínez Calleja, siendo él, en México, el primer profesor oficial de *Antropología física*.¹

¹ *Anales del Museo Nacional de México*, 1887, IV, 4.

Pocos meses subsistió el profesor, pues habiéndose separado el Sr. Dr. Sánchez de la dirección del Museo, por causas que no se explicaron, fué suprimido y la naciente Sección de Antropología se refundió en el Departamento de Zoología, quedando todo ello al cuidado de un ayudante naturalista.

Con motivo de la conmemoración del Centenario del descubrimiento de América, el Gobierno de la República Mexicana fué invitado por el de España, a concurrir a una Exposición Histórica, que con ese motivo se celebraría en Madrid el año 1892. Para acopiar objetos para esa exhibición se hicieron exploraciones en varias regiones de nuestro país, y ellas proporcionaron algunos restos humanos de indios antiguos y actuales. El Padre Aquiles Gerste (S.J.) agenció algunos cráneos y una momia de niño, entre los trogloditas Tarahumares. El Dr. Manuel M. Villada exhumó "abundante cosecha de materiales osteológicas," en los cuecillos de Guadalcázar (S. Luis Potosí), contruidos por los Pames. Don Manuel Ticó hizo excavaciones en la gran plaza de Santiago Tlaltelolco "que dieron copioso material arqueológico y osteológico." Todo ello se llevó a Madrid para la exposición mencionada. Después de esto la pequeña colección del Museo permaneció sin aumento alguna hasta mediados del año 1895 en el que, con motivo de efectuarse en la Ciudad de México la 11ª reunión del Congreso Internacional de Americanistas, ordenó el Sr. Lic. D. Joaquín Baranda, Secretario de Justicia e Instrucción Pública, se restableciese el antiguo Departamento de Antropología, comisionando para ello a los Señores Profesor Alfonso L. Herrera y Dr. Ricardo Cicero.

Ambos sujetos tomaron con grande empeño su encargo, y aprovechando lo existente en el Museo y lo que en lo particular habían coleccionado los Señores Licenciado Protasio P. Tagle y Dr. Paul Maury, más lo que se extrajo de las excavaciones practicadas por cien zapadores bajo las órdenes del Sr. Coronel Joaquín Beltrán, junto a la barda que limita la Aduana por el Norte y otras en el recinto de la misma Aduana, en la antigua plaza de Tlaltelolco.

Reunido todo ello formó una regular colección que se arregló y expuso convenientemente, en dos grandes vitrinas, en un salón especial del Museo Nacional que medía 10m. 60 cents. de largo, por 8m. 40 cents. de anchura.

Pasado el Congreso Americanista se devolvió lo prestado a sus dueños, quedando con lo restante arreglado y constituido el Departamento Antropológico.

IV

Nada se volvió a hacer, después de lo narrado, en el sentido de aumentar la colección o dotar al laboratorio antropométrico con los instrumentos y aparatos necesarios, y quedó todo ello al cuidado del ayudante naturalista como un anexo al Departamento de Zoología. Así permanecieron las cosas hasta el año de 1900, en el cual fui nombrado ayudante naturalista. Mi labor principal consistió, por de pronto, en acrecer la colección antropológica, logrando que se invirtiera en ello algo de la exigua cantidad en ese tiempo asignada al Museo.

Me presenté a desempeñar el cargo que se me confiara con los antecedentes que a continuación expreso: el año de 1886 al fundar el Museo Michoacano el ilustre e inolvidable Sr. General Mariano Jiménez y ponerlo bajo mi dirección, dediqué especial atención a la Antropología física de los indios Tarascos y en los "Anales" de ese Establecimiento publiqué algunos pequeños estudios referentes a esa materia¹. Reuní también un buen número de cráneos exhumados de antiguos enterramientos indios y comencé a coleccionar cerebros humanos, los que en mi calidad de médico de Hospital Civil de Morelia podía proporcionarme.

Las circunstancias me arrancaron de ese puesto el año 1892 y no sé lo que habrá sido de todos esos objetos, tan preciosos para la Ciencia. Con esa humilde labor que era una preparación, creí que podría intentar la más vasta del Museo Nacional y en ella me ocupaba, venciendo no pocas dificultades, cuando en la Primavera del año 1902 efectuó su segundo viaje de exploración a México el antropólogo Dr. Aleš Hrdlička. Este sabio, con desinterés poco común, se prestó a perfeccionar y aumentar mis conocimientos en la Antropometría y Osteometría, dándome por algunas semanas lecciones y enseñanzas prácticas. Bajo su dirección arreglé y estudié todo lo que había en la Sección de Antropología física, a mi cargo, exponiéndolo de manera que fuese útil para las investigaciones científicas y que a la vez satisficiera la curiosidad de los visitantes al Museo. Los restos humanos se colocaron en dos grandes vitrinas, los normales en una y los anormales y patológicos en otra; después se les subdividió en grupos según la tribu, según la clasificación lingüística que formuló y consta en mi estudio: "Familias lingüísticas de México."²

¹ *Anales del Museo Michoacano*, Morelia, 1890, III.

² *Anales del Museo Nacional de México*, 1903, LXX, 279-335.

Poco tiempo hacía que el Sr. Dr. Hrdlička había dejado a la ciudad de México cuando recibí en el Museo la visita del odontologista Dr. A. Howard Thompson, de Topeka (E. U. A.) Este se dedicó a estudiar el sistema dentario de los cráneos coleccionados. Formamos entonces entre ambos una colección de estos apéndices del esqueleto humano, después de haber hecho la medición de cada diente, clasificándolos y arreglándolos en cuadros especiales.

V

El año 1903 se fundó en el Museo la cátedra de Antropología y Etnología que se me confió, tocándome por ello ser el primero que en México diese, oficialmente, enseñanza de estas materias, pues aunque el Sr. Dr. Martínez Calleja tuviese con años de anterioridad, como queda relatado, el título de Profesor de Antropología, no fué en realidad sino el conservador de esa Sección. Acompañado de mis alumnos y durante los años de 1904 a 1907 efectué varias expediciones entre diversas tribus de indios de nuestra República en las cuales se hicieron investigaciones antropométricas, étnicas, lingüísticas e históricas, recogiendo a la vez productos de su industria y haciéndose numerosas fotografías.

Aprovechando los datos somatométricos, las fotografías, los moldes en yeso de la cara y extremidades de algunos de los individuos estudiados que se tomaron y varias piezas de indumentaria originales, se pudieron arreglar estatuas de yeso representando ellas una pareja *Popoloca* y una *Mazateca*, ambas de la familia mixteco-tzapoteca. La pareja popoloca se exhibe actualmente en el Departamento de Etnografía; y la de la mazateca solamente la de la mujer se terminó, porque la del varón quedó a medio hacer y abandonada entre los desechos del Museo.

Fruto de mis enseñanzas fué la imperfecta labor de mis discípulos A. Rodríguez Gil y C. Macías, en su expedición entre los indios *tuxpaneca* del Estado de Jalisco, publicada en los "Anales del Museo Nacional."¹

Causas que no son del caso relatar aquí imposibilitaron mi permanencia en el Museo Nacional del cual me separé a mediados del año 1907. En Septiembre de 1911 volví a ingresar al cuerpo de Profesores del Museo, y entonces se dividió la antigua cátedra de Antropología y Etnología y sus departamentos de exposición anexos,

¹ Tom. II, 3ª época, *México*, 1910.

en dos cátedras; una de *Antropología física* y *Antropometría* y otra de *Etnología*. Quedó a mi cargo la primera y la colección somática con ella.

Cuando me separé del Museo, en 1907, esta colección quedó instalada y clasificada, es decir, rica y floreciente; a mi vuelta al mismo Establecimiento la encontré dispersa, anulada y casi destruida. El antiguo local que ocupaba se destinó a reproducciones en yeso de objetos arqueológicos. Una parte mínima de los cráneos se arrumbó en unos escaparates desvencijados, y el resto o sea la mayor parte de los cráneos, huesos largos y cortos, se hacinaron en las bodegas. No exajero afirmando que algo más del 50 per cent de la mencionada colección se inutilizó y el resto quedó tan maltratado que bien pudiera conceptuarse como inservible. Un penoso trabajo de reconstrucción nos ocupó durante varios meses, y se logró escapar algunos ejemplares interesantes que actualmente enriquecen la nueva colección que he adquirido. Ocupa ella dos salones de 10m. 50 cents. por 8m. 25, destinados uno para exposición a los visitantes y otro para laboratorio, ambos con escaparates murales en los que adecuadamente colocados y clasificados se guardan los restos humanos.

Para los trabajos antropométricos se compraron nuevos instrumentos y aparatos, pues de los que antes existían encontré unos cuantos e inutilizados.

VI

La *Antropometría Militar* ha más de medio siglo que se implantó en México aunque de una manera empírica e imperfecta y sin ningún plan metódico; en la actualidad, según me informan, se reduce a tomar medidas de estatura y braza y a hacer la llamada *filiación*, al estilo jurídico antiguo, y creo solamente con los enganchados voluntarios.

VII

La *Antropometría Criminal* o sea la identificación científica de los reos, se implantó por vez primera en nuestro país, en la ciudad de Puebla, y en su cárcel Penitenciaria merced a los esfuerzos y labor del Dr. Francisco Martínez Baca. Durante algún tiempo trabajó él en ese asunto y también en otros de Antropología general, y publicó algunos estudios que se vulgarizaron en Europa, traducidos a la lengua italiana.

En la actualidad se ocupa del trabajo antropométrico de la Penitenciaria de Puebla el Dr. Manuel Vergara, a cuya amabilidad debo las subsecuentes noticias históricas:

“La Penitenciaría de la Ciudad de Puebla se fundó el 2 de Abril del año 1891 y quedó desde luego instalado en ella el gabinete de Antropometría, el cual fué dotado paulatinamente con los aparatos y útiles indispensables para el estudio de los reos. Se nombró médico del Establecimiento y Director del Departamento Antropométrico al Dr. Francisco Martínez Baca y médico ayudante al Dr. Manuel Vergara. Desde entonces y hasta el año 1902 se hicieron estudios craneométricos de los cráneos de los reos que iban muriendo en el Establecimiento y aquellos se fueron colocando en el Museo respectivo, en donde quedaban clasificados, según los delitos, mediante una cédula en donde constaban los principales datos.

“El estudio completo de cada cráneo figura desde entonces en hojas impresas, en las cuales se detallan todas las medidas de las diversas regiones craneanas y su capacidad.

“En estas hojas se han formado series separadas, según los delitos; y se hace la concentración con los términos medios en otras. Así es, que de cada delito hay una serie con su estudio completo.

“En los primeros estudios craneométricos, se siguió el método de Benedikt; pero más tarde se adoptó el de Broca, por ser el generalmente aceptado entre los antropólogos.

“Además de los estudios craneométricos, casi desde la inauguración del gabinete, se estudiaban los reos de modo más completo, desde el punto de vista de la Antropología criminal, particularmente a aquellos que, por las circunstancias en la comisión del delito, u otras, son dignos de especial estudio. El examen del reo se hace desde todos los puntos de vista; medidas antropométricas, particularidades anatómicas, descripción detallada de la fisonomía, y cuando es necesario, del tronco y de los miembros. Desde el punto de vista fisiológico, se estudia el clima en que se han desarrollado, su alimentación &c. &c., la sensibilidad y con especialidad la de los sentidos; la fuerza y resistencia musculares; la capacidad respiratoria; funcionamiento cardíaco y reacciones vasculares con más aquellas relacionadas con las influencias meteorológicas.

“Desde el punto de vista psicológico se investiga la herencia, costumbres, educación, instrucción, sentimientos religiosos, profesión, estado civil, etc.; todo esto como preparación para el estudio de sus facultades mentales y efectivas, y de la voluntad; además se estudia la forma de la escritura y el *caló*. Siempre que es posible se recojen trazados gráficos por medio de instrumentos. Estas investigaciones se apoyan en el proceso del reo, cuando puede obtenerse, y en todo

caso, la ejecutoria del mismo, de la cual queda un extracto en el Gabinete.

"Todos los datos recogidos se apuntan en un libro agregando los gráficos tomados, un extracto de la ejecutoria y el retrato del reo, de frente y de perfil.

"Todo reo al ingresar al Establecimiento se le retrata de frente y de perfil, tal como llega; con el pelo crecido, barba, &c. y así se conserva su tipo. Los retratos se coleccionan, clasifican y conservan en un álbum en el cual llevan el número de orden, y el de su celda; además, el libro está dividido en secciones, cada una para los diversos delitos. Actualmente hay cuatro álbumes y el último, que es voluminoso, ya está casi lleno.

"Con los llamados *cuerpos de delito* se formó desde un principio un museo especial, en el que están clasificados estos según la circunscripción de *distritos* del Estado. Cada objeto tiene una tarjeta con número de orden y los datos que constan en el oficio de remisión, todo lo cual está registrado en un índice especial.

"Hasta la fecha hay 380 objetos en ese Museo que debiera ser mucho más rico si los Juzgados enviasen todos los *cuerpos de delito*.

"En los primeros tiempos, posteriores al Establecimiento del gabinete antropométrico, no se practicaba la identificación científica de los reos, mas desde el año 1902 se comenzó a hacer y actualmente es lo primero que se ejecuta con ellos, al ingresar a la Penitenciaría. El sistema adoptado es el Bertillon, hasta en sus muebles, para el ordenamiento de las tarjetas signaléticas.

"Está dotado el laboratorio antropométrico con los aparatos e instrumentos subsecuentes: romana Fairbank, cartabones, craneómetro de Morton, goniómetro de Jacquard, pletismógrafo y ergógrafo de Mosso, estereógrafo de Broca, cilindro registrador, máquinas eléctricas, osteogoniómetro, esfigmógrafo de Dudgeons, dinamómetros de Burg y de Mathieu, espirómetro de Barens, barenstesiómetro y termestesiómetro de Eulenbrug, esfigmógrafos, etc.

"En esta ciudad se han hecho algunos aparatos, como el goniómetro de Jacquard, un compás de gruesos, un osteogoniómetro destinado a medir el ángulo de torsión del húmero, inventado por los señores Martínez Vaca y Vergara, y un cartabón para medir en el hombre vivo el diámetro vertical de la cabeza, ideado por los mismos.

"Los aparatos e instrumentos que se usan en la medición de los cráneos son: compás de gruesos de Broca, de corredera, goniómetros facial de Broca, mediano, occipital de Daubenton y mandibular;

medidas graduadas de estaño, embudos, cintas métricas, probetas de cristal, husos de madera, munición de plomo, en fin, todo lo que exige el método de cubicación de Broca.

"En el Museo hay algunas piezas anatómicas; cuando los cerebros o algún otro órgano tienen particularidades dignas de estudio se conservan y preparan convenientemente.

"Han sido médicos directores de la Penitenciaría, los Drs. Francisco Martínez Vaca, Alberto O'Farrill y Manuel Vergara; auxiliares los Drs. Vergara, Juan Grajales y Gabriel Abaroa."¹

En la ciudad de México y por el año 1890 el malogrado cuanto inteligente Dr. Ignacio Fernández Ortigoza se dedicó con empeño al estudio de la Antropometría criminal y procuró persuadir a cierto grupo de empleados del ramo de Justicia de las ventajas que traería la identificación antropométrica de los reos, si se estableciese en la Cárcel General de la ciudad de México, substituyendo con ella la arbitraria filiación hasta esa época practicada.

Con motivo de la Exposición Internacional de Filadelfia se presentó una buena oportunidad para que el Dr. Fernández Ortigoza hiciese un viaje de estudio a los Estados Unidos y a Europa, dándosele una comisión entre los empleados que México designó para aquel certamen y encargándole estudiase y practicase el *bertillonage* en las naciones que visitara. Así lo hizo en el transcurso del año 1899 que estuvo fuera de México, tanto en los Estados Unidos como en varios puntos de Europa, pero con especialidad en París al lado del Dr. A. Bertillón.

Bien instruido y documentado en ese particular regresó a México a recoger sólo decepciones. Después de no poco trabajo logró que uno de los Consejales del Ayuntamiento de la ciudad de México le comisionara para escribir una *Memoria* referente a la identificación de los reos, la cual terminada la presentó el mencionado munícipe a la Honorable Corporación. Fué esta leída y escuchada con atención, ordenándose después que se imprimiese y distribuyera. .

Como resultado de lo referido, entre los años 1903 y 1904 se estableció en la llamada Cárcel de Belem" el sistema antropométrico de Bertillon, tal cual entonces se practicaba; y aconteció, increíble parece, que se confiara la dirección de ese servicio a un médico desconocedor del todo en el asunto, al Sr. Dr. Dn. Ignacio Ocampo, debiendo haberse utilizado para ello al Dr. Fernández Ortigoza, promotor de aquella mejora y persona competente para ello.

¹ Lo relatado pasaba el año 1912. Posteriormente se suprimió el servicio antropométrico de la Penitenciaría y no sé si se ha repuesto o nó.

Guiándose solamente por la lectura de la obra de Bertillon, "*Instructions signalétiques*" se hicieron las mediciones y observaciones correspondientes durante mucho tiempo, pues ninguno de los antropometristas posteriores, exceptuando al Dr. Martínez Baca, que por algunos meses estuvo al frente de ese servicio, tenía enseñanza previa ni menos práctica de laboratorio. Frecuentes cambios en el personal de la Oficina han impedido que los empleados perfeccionen su labor, y se adiestren en la especialidad.

Al presente (año 1912) el laboratorio antropométrico de la Cárcel General de la ciudad de México está ubicado en la misma Cárcel y en tres salas, destinadas: una a la Dirección del personal médico entre el cual están considerados los del servicio Antropométrico; otro a los estantes con las tarjetas de identificación, y la restante a la instalación de los instrumentos. En esta sala están el antropómetro para medición de estatura, busto y braza, aparato muy maltratado por el uso; banco para el busto, taburete para el pié, caballete para la codada, parato para las impresiones digitales, compases y escala de los colores del iris.

Un solo juego de instrumentos, bastante usados, es la dotación del laboratorio; dos o tres antropometristas no podrían cómoda y fácilmente trabajar a la vez y cualesquiera accidente que inutilizara los instrumentos, paralizaría el trabajo. Los empleados del mismo son: un Jefe, un antropometrista y un ayudante de este. Para la vasta y árdua labor de esa prisión, es un personal muy escaso, y habrá que trabajar con alguna precipitación para cumplir con las necesidades diarias. En el sistema de clasificación de fichas y los datos que en ella se recojen, no se sigue rigurosamente el sistema Bertillon, sino que se ha abreviado. Las fotografías se toman al arbitrio y no según y con el aparatos de fotografía métrica, modelo A. Bertillon-Durand.

El frecuente cambio de personal antropométrico que por otra parte, como antes se dijo, no ha recibido enseñanza especial ni práctica en laboratorio, influirá de seguro en la exactitud de los resultados. Es de desearse que tan importante oficina se cimente bajo mejor plan. Los actuales empleados en la misma son personas empeñosas que sabrán fácilmente ponerse a la altura de su misión, siempre y que puedan contar con elementos y seguridades futuras.

Al inaugurarse la Penitenciaría de la ciudad de México, el año 1900, su entonces Director, Dr. Francisco Martínez Baca, pensó arreglar en la misma un servicio de identificación antropométrica y aun dotó con instrumentos y aparatos la Sección respectiva, pretendiendo que

allí se midiesen los reos que ingresaran sin haberlo sido en la Cárcel General. Como transcurriese el tiempo y no se presentará ese caso, se ordenó que todos los instrumentos y muebles se enviasen al laboratorio de Belem.

Una prescripción del Reglamento de la Penitenciaría ordena que todo sentenciado que allí fallezca sea autopsiado y se conserve su cráneo. Así se ha hecho hasta el presente, y ello ha producido una interesante colección de cráneos de criminales cuyo número asciende, al escribirse estos datos, a 131 piezas.¹

En Guadalajara, capital del Estado de Jalisco, se estableció en la Penitenciaría el año 1899, la identificación antropométrica de los reos, aunque solamente "en parte," encomendándole la organización y dirección de ella a un sujeto de origen cubano que se hacía pasar por médico, llamado Aurelio Silvera. Poco tiempo permaneció él en tal empleo y al dejarlo se confió la medición y observaciones a los escribientes de la Alcaldía.

Se inauguró en Coyoacán (D.F.) el 14 de Septiembre del año 1903 una "Casa de corrección para mujeres menores de edad" y en ella se estableció, el 10 de Agosto de 1908, un gabinete antropométrico para la identificación, según Bertillon, quedando ello a cargo del médico del Establecimiento. Arregló el gabinete, la cédula correspondiente, el mobiliario, instrumentos y demás, así como también dió enseñanza técnica al antropometrista, el Sr. Carlos Rougmagnac, empleado entonces en el Gobierno del Distrito Federal, sin conocimientos científicos ni práctica de laboratorio en esa materia.

Años después se preceptuó hacer allí la investigación dactiloscópica de Vucetich, a propuesta del Dr. Miguel Lazo de la Vega, médico entonces de la casa. El frecuente cambio de médicos es motivo para que el servicio resienta perjuicios en su exacto funcionamiento, y de seguro sobrevendrá faltas de exactitud en las mediciones, tanto más cuanto que la técnica, según ingenuamente me informó la Señora Sub-Directora, pasa allí de médico a médico, *como por herencia o tradición*, de la cual es depositaria la escribiente.

VIII

El año 1902 se establecieron en la "Escuela Normal para Profesores" los reconocimientos médicos de los escolares, de un modo más completo

¹ Actualmente se encuentran en el Departamento de Antropología física del Museo Nacional.

y metódico que en épocas anteriores. Con este motivo el encargado de esa labor Dr. Eugenio Latapí, se ocupó en hacer algunas mediciones antropométricas, siendo el promotor de esta investigación el Profesor Enrique C. Rebsamen, Director de ese Plantel. En 1905 el Director de la misma, Sr. Alberto Correa se ocupó de reglamentar el Departamento. En Julio de 1906 la "Dirección General de Instrucción Primaria" creó una *Sección de Higiene y Antropometría Escolares*, estableciendo los exámenes individuales de los alumnos de las Escuelas Primarias, y la encomendó al Dr. Máximo Silva, quien comenzó a practicar "exámenes individuales y antropométricos con niños llevados de las diferentes escuelas a la "Dirección General de Educación Primaria," y según los tres "Informes" rendidos por el mismo, de 1906 a 1907, se sabe fué muy corta la labor antropométrica. Quizá en vista de ello la Secretaría de Instrucción Pública y Bellas Artes dispuso en Abril de 1908 que "el personal de la Sección de Fisiología Experimental, del Instituto Médico Nacional, se dedicará, fundamentalmente, a investigar cuales son los promedios anatómicos y funcionales de los niños mexicanos, desde su nacimiento hasta los catorce años, según las diversas edades." En Diciembre del mismo año se comenzaron a medir, con tal objeto, los niños del "Hospicio de Huérfanos" habiéndose nombrado Jefe de ese "Servicio Antropométrico" al Dr. Daniel Vergara Lope, con un ayudante médico y un auxiliar estudiante de medicina. Para ejecutar este trabajo, el Dr. Lope estableció un sistema especial de su invención, con instrumentos y técnica del todo suyos, demasiado complicado. Así funcionó esta oficina hasta el 1°. de Agosto de 1909, fecha en la que se acordó su separación del Instituto Médico y se anexó al "Servicio Higiénico Escolar" con el nombre de "Servicio Antropométrico Escolar." No obstante la nueva orientación y denominación de esta oficina, se continuó la medición en los niños asilados del Hospicio, sin que los alumnos de las escuelas se utilizaran para ello. En esta forma se trabajó hasta Septiembre del año 1912, fecha en que el autor de estas *Notas* sustituyó al Dr. Lope en ese puesto.

Como queda puntualizado antes, tanto el sistema de medición hasta entonces empleado, como la mayor parte del instrumental y técnica usados, eran invento del Dr. Lope y por lo mismo los resultados obtenidos, ya en detalle ya en conjunto, no eran comparables con los de los demás antropometristas, propuse el cambio completo del mismo y la adopción del sistema de Broca, en cualquiera de los métodos en uso por reputados antropometristas. Me recomendó entonces el

Jefe del Servicio Médico Escolar y aun me indicó era su deseo que se implantase el sistema del Dr. Paul Godin, expuesto en su obra "*Recherches Anthropométriques sur la croissance des diverses parties du corps*," París, 1903. Lo hice así arreglando una cédula según lo que en la mencionada obra consta y ejecutando las mediciones con arreglo a lo que allí se preceptúa y a las instrucciones clásicas de la escuela de Broca. Al poco tiempo de trabajo palpé los inconvenientes de tal sistema, tanto en el orden científico como en el social y económico. Esto, unido al juicio crítico que del mismo me hizo mi maestro el Dr. Aleš Hrdlička¹ me desalentó sobremanera y supliqué al mencionado Sr. Hrdlička me arreglase una cédula conveniente, teniendo en cuenta no sólo la ciencia pura sino también el medio social y el personal y tiempo de que yo disponía para esa labor.

Así lo hizo este Señor y como coincidiera con ello un viaje que hice a los Estados Unidos en el Otoño del año 1912, pude conferenciar con él mismo y recibir prácticamente instrucciones y algunas aclaraciones.

Como la divergencia de opiniones en la materia provocase frecuentes dificultades solicité de la Secretaría de Instrucción Pública la autonomía del Servicio Antropométrico, la cual me fué concedida en 6 de Febrero de 1913 incorporándolo al Departamento de Antropología Física del Museo Nacional, que estaba y está a mi cargo.

¹ *Smithsonian Institution*, United States National Museum, Washington, D. C., November 23, 1911. *Dear Doctor León*: I have received today your "Cedula Antropométrica." If you want my opinion of it, I will say frankly that it is wholly impracticable. Not only that but there are a number of measurements included which could easily lead to commissions of acts against decency, and which would be liable to do great deal of harm to the whole cause. I have made a number of marks on the schedule; those measurements marked with a dash I consider quite useless and they should be excluded. It is very plain that the scheme is a purely theoretical one. It is true that it agrees with the system of the Paris School of Anthropology, but these detailed measurements are not taught to be practiced by half experienced or inexperienced men or women, and in schools. However, even if all these measurements could be taken properly, I doubt very much if any one would be found about you who could properly arrange, analyze, and present the results. Reduce your measurements and observations until they are absolutely practicable, and then, even if the data should not amount to one-hundredth part of what is now intended, they will be of value. I would like to see you take an open, public, firm stand on this question, because it is certain that the future will bear you out. Even if you fail to effect a reform, it will be honorable to have your protests on record. You may freely quote what I say and use my name in objection to the present system which would ruin rather than advance the prospects of anthropology in the Mexican schools. Sincerely yours, ALEŠ HRDLIČKA, *Curator*, Division of Physical Anthropology, United States National Museum.

En estas condiciones pude implantar la cédula Hrdlička, y arreglado a ella se continuaron haciendo las mediciones.

Parcialmente, y sin satisfacer todas las exigencias de la Ciencia, se tomaban anualmente por los médicos inspectores de las Escuelas Primarias y algunas de las Secundarias y Normales, del Distrito Federal, medidas de estatura y peso. Los maestros de las Escuelas Primarias ayudaban en ello, aunque sin instrucción previa y forzados por sus Superiores. El número de *estaturas* tomadas y peso individual apreciados durante los años escolares de 1910 a 1912. fueron en número de 59,629 correspondiendo 28,002 a los niños y 31,625 a las niñas. Los resultados de ello han sido calculados por el Dr. W. G. Gómez quien los ha publicado con los correspondientes gráficos.

La antigua cátedra de Antropología y Etnología del Museo Nacional, cuyo origen y vicisitudes quedan relatados, se dividió el año 1911 en dos, quedando a mi cuidado la de Antropología Física y Antropometría con el Departamento y colecciones correspondientes.

El Presupuesto de Egresos del año 1912-1913 autorizó tres pensiones para estudiantes de esta cátedra, las que mediante concurso habido entre seis opositores, el día 25 de enero de 1913, se concedieron a los cursantes de Medicina, Angel C. Castellanos, Emiglio Martínez y Eliseo Ramírez. Las clases se inauguraron el día 1º. de febrero del mismo año impartiendo oficialmente, en México, por vez primera, y por el que esto escribe, enseñanza teórica de Antropología y práctica de Antropometría y Osteometría, en todas sus aplicaciones.

IX

La "Escuela Nacional de Altos Estudios" se inauguró en septiembre de 1910, y para cubrir su programa se contrató a algunos profesores extranjeros, principalmente de los Estados Unidos del Norte, confiándoles cursos en la misma. Uno de ellos fué el Sr. Profesor Dr. Franz Boas, de la Universidad de Columbia (New York) y a él se le asignó la cátedra de Antropología. No se puntualizó si esta enseñanza sería de Antropología física o de Etnología y lo que en realidad se enseñó fué principalmente esta última.

Inició el Sr. Boas sus cursos en el mes de diciembre del año 1910 ocupándose en una parte del mismo de "La Estadística en sus aplicaciones a la Antropometría." Estas clases tuvieron por discípulos principales a los Médicos del "Servicio Higiénico Escolar" y se dieron en un salón del edificio que esa oficina ocupaba. Expuso en ellas el

Profesor la manera de apreciar y calcular los resultados de la Antropometría y se hicieron algunas mediciones de niños. Terminó el primer curso a principios del año 1911.

En marzo de 1912 reanudo el Sr. Boas sus lecciones, y según el programa impreso que se circuló, abarcaría en ellas los puntos siguientes: 1°. *Biometría general*; 2°, *Antropometría del crecimiento individual*; y 3°, *Metodo del estudio de las lenguas indias*.

Personas que asistieron a esas lecciones informan que no se ejecutó trabajo antropométrico alguno, en ellas.

X

Tanto las bibliotecas públicas de la ciudad de México como las privadas, carecieron por muchos años de libros referentes a la Antropología física y a la Antropometría. En una época no lejana la única biblioteca mejor dotada, en este particular, era la del Lic. Protasio P. Tagle en la cual se encontraba una colección completa de las publicaciones de la "Sociedad Antropológica" de Francia; la del Museo Nacional tenía tomos aislados o truncos de lo mismo y hasta ha pocos años adquirió algunas cuantas obras de esas materias, pero de las más comunes. La Biblioteca Nacional nunca ha adquirido libros de esta clase. El Museo Nacional recibía cinco publicaciones de esta materia y ya queda dicho lo que se encuentra en la de la Escuela de Altos Estudios.

No existe en todo el país un verdadero laboratorio antropométrico, pues el del Museo tiene solamente los más indispensables instrumentos para Antropometría y Osteometría. En el Servicio Antropométrico Escolar la dotación de instrumentos es la muy limitada para sus labores. En la Cárcel General queda puntualizado lo que existe.

Contados cultores ha tenido la Antropometría en México, y en su mayor parte han sido personas entusiastas, sin la necesaria especial preparación teórica ni enseñanza práctica de laboratorio. Enumeraré entre ellos al Sr. Licenciado Protasio P. Tagle, quien reunió una pequeña e interesante colección de cráneos; al Señor General Vicente Riva Palacio que publicó algunas notas antropológicas referentes a los indios de México; al Doctor Don Jesús Sánchez, Profesor Alfonso L. Herrera, Doctor Ricardo Cicero, Doctor Daniel Vergara Lope, Doctor José de Jesús Sánchez, Doctor Florencio Flores, Doctor Manuel T. González, Doctor Francisco Martínez Baca y Señor Leopoldo Batres. Los Doctores Ignacio Fernández Ortigoza y Manuel Vergara poseían la técnica antropométrica, pero no se han dedicado a ella con todo el tiempo necesario.

XI

De los Arqueólogos y naturalistas extranjeros que con fines científicos han visitado y estudiado las cosas de México, solamente unos cuantos de entre ellos se han ocupado de la medición de nuestros indios y de la recolección de sus osamentas. M. Desiré Charnay midió y fotografió algunos indios mayas de Yucatán y Chiapas.

El Dr. Aleš Hrdlička, ha hecho cuatro viajes de exploración al territorio mexicano: el 1°. en 1908, y empleó en él tres meses, el 2°. y 3°. en 1902, invirtiendo un año; el 4°. en 1910. Midió y estudió las tribus indígenas subsecuentes: Tarahumara, Tepehuana, Opata, Pima, Pápago, Yaqui, Mayo, Cora, Huichol, Nahua de Tuxpan (Jalisco), Tarasco, Othomí (Estados de Hidalgo y Distrito Federal), Mazahua, y Tlahuica de Morelos. Tomó numerosas fotografías y moldes en yeso, sobre el vivo, (cara y extremidades). Los resultados de esa vasta labor se han publicado en parte, y se ven en los Museos de los Estados Unidos de Norte América.

El Profesor Federico Starr, en cinco viajes, emprendió y llevó a término un estudio ethnografico y antropométrico de veintitres tribus o grupos de indios de México, en los años de 1897 a 1901. Tomó moldes en yeso sobre el vivo, y después produjo una colección de bustos coloridos, al natural, que representan el tipo del grupo estudiado.

En 1894 el Señor W J McGee, del "*Bureau of American Ethnology*," Washington, exploró la isla del Tiburón (Baja California), y recogió esqueletos de los indios Seris, los cuales estudió el Dr. Hrdlička.

Recientemente el explorador francés M. Leon Diguez hizo una colección de huesos de indios de la Baja California, los cuales han utilizado científicos competentes, publicando varios estudios tocante a ellos.

XII

Pocas, aisladas, sin la preparación debida y sin método científico han sido, en su mayor parte, las investigaciones nacionales; para causar esa estéril labor y aprovechar tantas buenas voluntades y aptitudes, se hace necesario fundar un *Instituto Antropológico*, dotado con un buen laboratorio antropométrico. Así dará fruto la enseñanza del Museo Nacional, se creará en México esa especialidad científica, se harán numerosas mediciones bajo un mismo plan y con el mismo método, se recogerán y clasificarán los despojos esqueléticos que se reunan, y al cabo de pocos años se tendrá una colección que honrará a la cultura nacional y prestará los servicios de que hoy carecen la Etnología y Arqueología Nacionales.

ADDENDA

Lo relatado pasaba hasta el año de 1912; de entonces acá han acontecido serios trastornos en los asuntos públicos que han inñuido mucho en el adelanto de la Antropología en México.

La oficina de identificación antropométrica de la Cárcel General se clausuró y sus archivos perecieron en la asonada de Febrero de 1913. En 1914 se suprimió el servicio antropométrico escolar a propuesta del Dr. Manuel Uribe y Troncoso y dejaron de coleccionarse los cráneos de los criminales sentenciados que morían en la Penitenciaría. Afortunadamente en principios de este año logré recoger para la colección del Museo los cráneos que allí existían, faltando unos cuantos de entre ellos. En la casa Correccional de Coyoacán no se practican los señalamientos antropométricos e igual cosa pasa en la de varones, de Tlalpam.

La pelvimetría obstétrica que en 1811 establecí en el servicio de Maternidad del Hospital Morelos y en los Consultorios números 1 y 2 de la Beneficencia Pública que a mi cargo estuvieron, ha dejado también de practicarse. Los resultados de Antropometría y Osteometría que en el Departamento a mi cargo he obtenido, no se han podido publicar por falta de un calculador. La cátedra de Antropología física en la Escuela Nacional de Altos Estudios, a donde pasó en 1916 la del Museo Nacional, no ha podido funcionar con regularidad por falta de estudiantes convenientemente preparados para ese estudio y cuando algunos se han presentado ha sido pretendiendo serlo como *Amateur* y sin obligaciones de ninguna clase. Admitir pretensiones de esa naturaleza sería desconceptuar la cátedra y no dar provecho alguno a la Ciencia.

De todo lo narrado se deduce que tres han sido los principales obstáculos que la enseñanza de la Antropología física ha encontrado en México, y son ellos:—

- 1°. El concepto erróneo de la misma,
- 2°. La falta de elementos informativos (libros, periódicos, colecciones bien dotadas y convenientemente instaladas), y
- 3°. El ningún estímulo o provecho futuro para utilizar los conocimientos adquiridos.

La antigua "Inspección y Conservación de Momumentos Arqueológicos" que ya independiente o dependiente del Museo Nacional formó parte de la Secretaría de Instrucción Pública y Bellas Artes pasó a ser una dependencia de la Secretaría de Fomento el año 1917.

Allí cambió de nombre y objeto pues actualmente se denomina "Dirección de Estudios Arqueológicos y Etnológicos."¹ Su jefe es Sr. Manuel Gamio. Ha fundado, entre otras enseñanzas, la de Antropología física y Antropometría encomendando estas asignaturas al Dr. Miguel Lasso de la Vega quien abrió los cursos el 8 de Noviembre de 1917.²

La producción literaria nacional así como la extranjera referentes a la Antropo-somatología mexicana, es bien corta. La bibliografía que tengo reunida referente a ello asciende a 300 y tantos escritos y de estos los en número menor, son nacionales y los restantes extranjeros. Su valer científico es muy desigual, aun entre lo extranjero, y en lo del país casi en su totalidad se debe a aficionados con más buenos deseos que conocimientos y práctica en la materia.

Extenso y fructuoso es el campo que a los antropo-somatologistas presenta el Territorio de México; pero en tanto que los estudiosos nacionales no tengan un estímulo serio para dedicarse a sus investigaciones nada se hará que la pena valga.

¿A quién toca crear ese estímulo? . . . aquí no hay que pensar en los *particulares* y todo, al menos por ahora, tiene que esperarse del Gobierno.

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¹ Actualmente Dirección de Antropología.—Ed.

² Esta cátedra con otras de esa oficina se suprimieron en Junio de 1918.

³ En 1901 publiqué mis "Apuntes para una Bibliografía antropológica de México (Somatología)," logrando enumerar en ella 167 escritos. De entónces al presente he acaparado otras noticias las cuales unidas a las anteriores ascenden a más de 300. Hasta donde me ha sido dable he coleccionado estas noticias bibliográficas, estando muy lejos de haber agotado la materia. Son ellas solamente el principio de una labor que otros completarán y perfeccionarán, cuando dispongan de elementos bastantes. En casi su totalidad esos libros son de mi biblioteca, pues en las públicas o particulares de México no se encuentran sino muy pocas obras acerca de esta ciencia, y pocos periódicos de la especialidad, ya antiguos o modernos.

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SOME RACIAL CHARACTERISTICS OF THE WEIGHT OF THE HEART AND KIDNEYS

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This is the third of a series of articles on the weights of the organs, of which the other two have already appeared in this JOURNAL. The records are from the same sources as those of the preceding articles. In the present study the hearts or kidneys directly affected by disease have been discarded. This may have the effect of lowering the average weights, especially of the hearts, but the racial differences will not be affected. Only adults of 21 years old and over are included. The total weight will be given first, then the weights of the few normal organs that have been found in the material will be selected in order to determine the racial and sexual differences if any exist. All figures for the kidneys include the weight of both.

THE HEART
TOTAL HEART WEIGHT

Race-sex	Number	Average	Below 280 Grams	280 to 420 Grams	Above 420 Grams
White male.....	1007	310.4 gm.	32.9 per cent	61.4 per cent	5.7 per cent
Negro male.....	959	320.7	31.8	58.7	9.5
White female....	364	263.4	60.7	34.6	4.7
Negro female....	442	262.2	63.8	35.5	0.7

The heart of the negro male in general is larger than that of the white male, and the heart of the white female is larger than that of the negro female, but the differences are slight, and may be accounted for by other racial characteristics. There are more large, young, well nourished negro males, than white males in the series, and this may account for the difference. This difference was however found to exist at the Johns Hopkins Hospital in Baltimore, as well as at the Charity Hospital, New Orleans. The difference in heart weight between the white and negro females is so slight that it may be disregarded.

NORMAL HEART WEIGHT

Race-sex	Number	Average	Below 280 Grams	280 to 420 Grams	Above 420 Grams
White male.....	35	317.6 gm.	37.1 per cent	60.0 per cent	2.9 per cent
Negro male.....	42	342.9	7.1	88.1	4.8
White female....	18	260.0	61.1	38.9	0.0
Negro female....	3	216.0	100.0	0.0	0.0

The differences found in the normal heart weight are more marked than in the total heart weight, but there are so few individuals, especially among the females, that no conclusions should be drawn. Still the repeated excess in the negro male draws attention.

THE KIDNEYS

TOTAL KIDNEY WEIGHT

Race-sex	Number	Average	Below 280 Grams	280 to 420 Grams	Above 420 Grams
White male.....	911	339.9 gm.	22.6 per cent	60.6 per cent	16.8 per cent
Negro male.....	921	349.7	19.8	61.3	18.9
White female....	304	310.4	35.2	56.6	8.2
Negro female....	357	308.0	34.2	59.7	6.1

Here, as with the heart weight, the negro male gives a larger weight than the white male, and the white female larger than the negro female, although the difference between the latter is practically *nil*. The greater number of large, young, well nourished negro males may again account for the heavier kidneys in them.

NORMAL KIDNEY WEIGHT

Race-sex	Number	Average	Below 280 Grams	280 to 420 Grams	Above 420 Grams
White male.....	16	313.1 gm.	31.25 per cent	62.5 per cent	6.25 per cent
Negro male.....	21	308.7	38.1	52.4	9.5
White female....	9	287.8	44.4	55.6	0.0
Negro female....	4	305.0	50.0	25.0	25.0

The differences found in the normal kidney weight are so slight and so irregular and there are so few individuals that no conclusions can be drawn.

DISCUSSION

There seems to be little if any difference in the heart and kidney weight due to race. The sexual difference in the heart weight is greater than in the kidney weight, and inasmuch as the difference in

RECORDS OF PERSONS WHO MAY HAVE HAD NORMAL HEARTS

No.	Age	Stature, Cm.	Condi- tion of Nourish- ment	Heart Weight, Gr.	Ratio to Stature	Pathological Diagnosis
WHITE MALES						
<i>Johns Hopkins Hospital:—</i>						
1152	..	...	Good	410	....	Gunshot wound in head; hemorrhage.
1223	35	142	.....	265	1.87	Bronchitis; congestion of stomach.
1489	40	176	Good	350	1.99	Fractured fibula; fat embolism lungs.
1676	44	167	Good	320	1.91	Fractured skull. Hemorrhage. Ac. spl. tu. Parench. degen. of kidneys and liver.
1811	34	162	.....	300	1.82	Broken back. Compression of cord. Cystic abscess of kidneys. Colitis.
2485	27	174	Good	360	2.07	Traumatic cerebral hemorrhage.
2660	51	173	Good	250	1.45	Turpentine poisoning; ac. gas. & enter. congestion of kidneys.
2701	32	168	Thin	270	1.61	Trauma; hemorrhage of brain; crani- otomy.
2811	53	160	Thin	400	2.50	Fractured skull; hemorrhage; arterial sclerosis.
3132	54	...	.....	300	....	Fractured skull. Hemorrhage. Thrombosis lateral sinus. Bron- chopn. Art. Scl.
3240	44	149	Thin	260	1.75	Edema of brain and lungs; sunstroke fatty liver; scoliosis; chr. pleurisy.
3480	39	170	Good	370	2.18	Traumatic cerebral hemorrhage.
3520	29	162	.....	320	1.98	Fractured skull. Hemorrhage. Opera- tion. Bronchopneumonia. Fatty liver.
3552	24	164	.....	200	1.22	Bullet wound thorax. Hemorrhage. Myelitis. Fatty liver. Cloudy swelling of viscera.
4447	55	183	Good	350	1.91	Trauma of leg; fat embolism.
4583	27	183	Thin	340	1.86	Contusion of head and face and body. Thrombosis lateral sinus. Acute cystitis.
4769	33	166	Thin	260	1.57	Lacerations of thigh; operation.
4647	..	176	Good	400	2.27	Potassium cyanide poisoning. Hem- orrhage. Necrosis gastric mucosa. Slt. cirrhosis of liver. Enlargement of spleen.
4812	40	184	Good	250	1.36	HgCl poisoning; edema glottis, larynx, esophagus; hemorrhage; gastroen- teritis.
5041	24	167	.....	240	1.44	Fractured skull. Septicemia. Opera- tion. Inf. thrombus lateral sinus. Mult. emboli.
5189	38	162	Good	320	1.98	Electric shock.
<i>Charity Hospital:</i>						
1914						
214	35	170	Good	270	1.59	Fractured skull. Lacerated brain. Hemorrhage. Chronic nephritis.
431	33	157	Good	280	1.78	Gunshot wound liver, lungs, inf. vena cava. Hemorrhage. Fractured spine.

RECORDS OF PERSONS WHO MAY HAVE HAD NORMAL HEARTS

Continued

No.	Age	Stature, Cm.	Condi- tion of Nourish- ment	Heart Weight Gr.	Ratio to Stature	Pathological Diagnosis
1915 52	..	174	Good	370	2.12	Gunshot wound head; edema lungs; ac. neph.
320	..	190	Good	400	2.11	Heat exhaustion. Acute dilatation of the heart. Alcoholic gastritis. Chro- nic cirrhosis, fatty liver. Chronic interstitial nephritis.
387	45	170	Good	250	1.47	Acute poisoning.
441	..	165	Good	350	2.12	Fractured humerus. Laceration face and scalp. Cerebral hemorrhage. Bronchopn. Ac. pleurisy.
1916 123	32	175	Good	275	1.57	Mercuric chloride poisoning; acute enteritis and nephritis.
236	25	177	Good	240	1.36	Concussion of the brain.
1917 156	..	160	Good	530	3.31	Carbolic acid poisoning.
320	71	170	Good	360	2.12	Cerebral hemorrhage; fracture of vault.
340	59	167	Good	250	1.50	Hem. mes. art.; dif. periton.; chr. in- terstit. nephritis.
1918 13	..	170	Good	390	2.29	Acute gastritis (cause unknown).
92	..	170	Good	325	1.91	Fract. skull; hem; fract. 2-12 ribs; laceration, lung hemorrhages.
<i>Touro Infirmary:</i>						
1910 13	40	185	Thin	290	1.57	Fractured skull.

NEGRO MALES

<i>Johns Hopkins Hospital:</i>						
1735	52	167	Good	390	2.34	Tetanus; ecchymoses; congestion vis- cera.
1625	43	155	Good	350	2.26	Burns; edema of lungs.
1802	43	151	Good	350	2.32	Cerebral hemorrhage.
1930	50	180	Good	300	1.67	No pathological lesion found.
2834	52	170	Good	470	2.76	Trauma; broken spine; comp. cord; paralysis; infarct of lung.
2911	40	157	Good	400	2.55	Trauma; congestion kidney; cystitis.
3136	29	174	Good	270	1.55	Operation on brain. Edema lungs. Bronchopneumonia. Enteritis.
3418	56	175	Good	360	2.06	Fracture 6-7 vertebra; pressure on cord.
3879	23	168	Good	285	1.70	(Clinical diagnosis poisoning). Acute esophagitis, colitis, bronchitis, bron- chopn. Hem. pancreatitis.
4224	40	...	Good	400	....	Burns; pharyng., laryng.; bronchopn.; c.s.v.
4331	44	165	Good	380	2.30	Burns. Acute nephritis. Parenchyma- tous degeneration of viscera. Bron- chopneumonia. Liver thrombi.
4630	32	160	Good	275	1.72	Acute cocaine poisoning.

RECORDS OF PERSONS WHO MAY HAVE HAD NORMAL HEARTS

Continued

No.	Age	Stature, Cm.	Condi- tion of Nourish- ment	Heart Weight, Gr.	Ratio to Stature	Pathological Diagnosis
<i>Charity Hospital:</i>						
1914						
78	30	168	Good	304	1.81	Burns, first and second degree.
101	27	175	Thin	310	1.77	Gunshot wound intest.; septic pneum. and pleurisy.
228	38	...	Good	300	....	Gunshot wounds abdomen, thorax, face, thigh hemorrhage; ac. neph.; chr. splenitis.
281	34	175	Good	370	2.11	Gunshot wound sacrum; 9 perf. perit.; chr. neph.
284	26	171	Good	300	1.75	Perforating wound abdomen, intestine. Peritonitis. Acute and chronic nephritis.
287	50	...	Good	320	....	Fractured skull. Lacerated brain. Hemorrhage. Lobular pneumonia. Edema of the lungs.
310	..	163	Good	370	2.27	Hemorrhage brain; acute nephritis.
424	43	172	Good	250	1.45	Fract. skull; hemor.; ac. & ch. splenitis.
433	32	178	Good	360	2.02	Fractured humerus, olecranon, ulna, radius, femur. Bronchopneumonia.
1915						
148	30	166	Good	320	1.93	Gunshot wound abd.; perf. intes.; hemorrhage.
224	..	170	Good	350	2.06	Fractured skull; hemorrhage.
266	25	170	Good	330	1.94	Gunshot wound face. Perforation of brain. Septic lobular pneumonia.
317	35	190	Good	400	2.11	Perforating gunshot wound intestine. Peritonitis. Pyelitis. Acute parenchymatous nephritis. Hemorrhage. Early lobular pneumonia.
331	27	170	Good	350	2.06	Fract. pelv.; rupt. blad; hem.; shock.
435	29	175	Thin	370	2.11	Ruptured stomach. Digestion of diaphragm. Fractured skull, 10th rib and rt. scapula. Lobul. pneu.
1916						
34	22	165	Good	325	1.97	Ac. anem; ac. neph.; comp. fract. tibia and fibula.
90	37	176	Good	360	2.05	Fract. skull; hem.; fract. clav.; lac. face; pachymeningitis.
259	39	175	Good	410	2.34	Gunshot wound of the abdomen. Peritonitis. Bronchopn. Septicemia. Toxic nephritis. Aortitis.
292	24	160	Good	330	2.06	Gunshot abd.; perf. il. v., lungs, liver. Hemorrhage and shock.
308	..	160	Good	330	2.06	Cereb. hem. concus. and contus; fract. 10-5 rib; fracture left leg.
343	..	165	Good	310	1.88	Cereb. hemorrhage; subdural clot.
375	24	165	Good	280	1.70	Gunshot wound arm, mediast., lung; hemorrhage.
1917						
35	58	165	Good	325	1.97	Brain hem.; trauma?; chr. dif. neph.
39	80	160	Good	300	1.88	Fractured skull; cerebral hemorrhage.

RECORDS OF PERSONS WHO MAY HAVE HAD NORMAL HEARTS—

Continued

No.	Age	Stature, Cm.	Condi- tion of Nourish- ment	Heart Weight, Gr.	Ratio to Stature	Pathological Diagnosis
103	48	163	Good	330	2.02	Gunshot wound of head; meningitis.
108	24	175	Good	310	1.77	Gunshot wound abdomen & neck; hemorrhage.
121	24	171	Good	400	2.34	Fractured skull; cerebral hemorrhage.
158	30	180	Good	310	1.72	No cause of death found; congestion cord.
162	29	174	Good	450	2.59	Gunshot wound of abdomen and intestine. Peritonitis. Septicemia.
201	60	170	Good	400	2.35	Intes. obs.; chr. neph. and spl.; fatty liver; cardiac hypertrophy.

WHITE FEMALES

Johns Hopkins Hospital:

1801	24	150	.....	250	1.67	Perf. uterus; cystitis; thrombosis & embolism.
1794	38	...	Emac.	250	....	Rupt. puerp. ut.; hem.; anemia; bicor. uterus; vaginal septum.
2004	44	150	.....	220	1.47	Placenta previa. Ruptured uterus, cervix and vagina. Hemorrhage and anemia.
2278	23	161	Good	250	1.55	Tumor of brain.
3138	30	163	Good	250	1.54	Cerebral tumor; edema lungs; cystic ovaries.
3305	45	145	.....	300	2.06	Puerperal uterus. Ruptured rectum. Peritonitis. Anemic organs. Acute splenic tumor.
3800	28	153	Fat	260	1.70	Perforation of the uterus. Peritonitis. Pleurisy. Cloudy swelling of the viscera. Cystitis. Bronchopn.
4622	31	168.5	Fat	305	1.81	Operation. Abortion. Hemorrhage. Peritonitis. Bronch. Bronchopneumonia. Cloudy swelling of the viscera.
4950	30	161	Good	310	1.93	HgCl ₂ poisoning. Necrosis of the pharynx, esophagus, stomach, kidneys. Salpingoophoritis. Endometritis.
4964	38	155	Good	300	1.94	Cerebellar hemorrhage. Operation. Post-mortem. Cæsarian section. Seven months pregnancy.
4980	42	153	Good	275	1.79	Fractured femur. Operation wiring. Infected wound. Multiple pulmonary abscesses. Cloudy swelling of the viscera. Gall stones. Arterial sclerosis.
5183	34	150	.....	280	1.87	Cause of death undetermined; bronchopneumonia.

Charity Hospital:

1914						
354	46	122	Good	215	1.76	Fracture of vault; subdural hemorrhage.

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RECORDS OF PERSONS WHO MAY HAVE HAD NORMAL HEARTS—

Continued

No.	Age	Stature, Cm.	Condi- tion of Nourish- ment	Heart Weight, Gr.	Ratio to Stature	Pathological Diagnosis
426	37	...	Good	180	....	Fract. pelvis; cellulitis; fract. skull and right thorax (multiple).
1915	29	145	Good	220	1.52	Fract. skull, face; lac. br.; rupt. liver, kidney, lung; fract. pelvis; fat. liver.
261	30	164	Good	250	1.53	Narcosis; edema lungs; acute nephritis.
1916	64	150	Good	280	1.53	Infarct heart; myocarditis.
293	..	153	Good	285	1.86	Intest. obstruction; gangrene ilium.
1917						
89						

NEGRO FEMALES

<i>Johns Hopkins Hospital:</i>						
1737	24	154	Good	200	1.30	Intes.obst.;periton.;oper.;hemorrhage.
<i>Charity Hospital:</i>						
1916						
216	50	174	Good	250	1.44	Nephritis; arterial sclerosis; post-operative shock.
2180	37	173	Good	198	1.14	Pancreatitis; hysterectomy; hemorrhage; fatty liver; chronic nephritis; edema of lungs.

RECORDS OF PERSONS WHO MAY HAVE HAD NORMAL KIDNEYS

No.	Age	Stature, Cm.	Condi- tion of Nourish- ment	Kidney Weight, Gr.	Ratio to Stature	Pathological Diagnosis
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WHITE MALE

<i>Johns Hopkins Hospital:</i>						
1489	40	176	Good	L180	2.05	Fractured fibula. Fat embolism of lungs.
2485	27	174	Good	B260	1.49	Traumatic cerebral hemorrhage.
2811	53	160	Thin	L100	1.25	Fractured skull; cerebral hemorrhage; arterial sclerosis.
4769	33	166	Thin	R140	1.69	Lacerations of thigh; operation.
4647	50	176	Good	B300	1.70	Potassium cyanide poisoning; necrosis of the stomach.
4812	40	184	Good	R150	1.79	Mercuric chloride poisoning; edema of glottis, larynx, esophagus; hemorrhage; gastroenteritis.
....	..	...	.....	L180	....	Electric shock.
5189	38	162	Good	R220	2.72	
<i>Charity Hospital:</i>						
'14-431	33	157	Good	B200	1.28	Gunshot wound lungs, liver, vena cava; hemorrhage; fract. spine.
'15-353	40	165	Good	R120	1.39	Fractured mand.; cerebral hem.; multiple fract. ribs, sacrum, legs; lac. face; rupt. kid. and liv.
.....	..	...	.....	L110	....

RECORDS OF PERSONS WHO MAY HAVE HAD NORMAL KIDNEYS—

Continued

No.	Age	Stature, Cm.	Condi- tion of Nourish- ment	Kidney Weight, Gr.	Ratio to Stature	Pathological Diagnosis
387	45	170	Good	E150	1.76	Acute poisoning.
'17-236	25	177	Good	R160	1.69	Concussion of the brain.
.....	..	....	....	L140	....
156	..	160	Good	R200	2.56	Carbolic acid poisoning.
.....	..	....	....	L210	....
320	71	170	Good	E170	2.00	Cerebral hemorrhage; fracture vault.
'18- 13	..	170	Good	R170	2.00	Acute gastritis; cause unknown.
92	..	170	Good	B200	1.18	Fracture of skull; cerebral hemorrhage; fracture 2 to 12 left ribs; laceration lung; hem's.
<i>Touro Infirmary:</i>						
10- 13	40	185	Thin	B320	1.73	Fractured skull.

NEGRO MALE

<i>Johns Hopkins Hospital:</i>						
1625	45	155	Good	R150	1.94	Burns; edema of lungs.
3418	56	175	Good	B450	2.57	Fracture 6-7 vertebra; pressure on spinal cord.
4630	32	160	Good	R145	1.81	Acute cocaine poisoning.
<i>Charity Hospital:</i>						
'14- 78	30	168	Good	R162	2.07	Burns, 1st and 2nd degree.
.....	..	....	....	L186	....
228	38	...	Good	B220	....	Gunshot wounds of abdomen, thorax, face; hemorrhage: acute nephritis; chronic splenitis.
424	43	172	Good	B265	1.54	Fractured skull: cerebral hemorrhage acute and chronic splenitis.
'15-224	..	170	Good	R160	2.00	Fractured skull: hemorrhage.
.....	..	....	....	L180	....
'16- 90	37	176	Good	R 82	....	Fractured skull, hemorrhage: pachy- meningitis; fractured clavicle: con- tusion and laceration of face.
.....	..	....	Good	L 83	0.94	
'16-292	24	160	Good	R150	1.94	Gunshot wound of abdomen; perf. r. iliac vein, lungs and liver; hem. and shock.
.....	..	....	....	L160	....
194	23	155	Good	E160	1.68	Tumor base brain; local meningitis; edema of lungs.
297	23	160	Good	R130	1.69	Surgical shock.
.....	..	....	....	L140	....
308	..	160	Good	E125	1.56	Cerebral hemorrhage; concussion, con- tusion; fractures 5-10 ribs; fracture left leg.
343	..	165	Good	R260	3.09	Cerebral hemorrhage; subdural clot.
.....	..	....	....	L250	....
375	24	165	Good	R130	1.64	Gunshot wound left arm and left mediastinum; perforation left lung; hemorrhage.
.....	..	....	....	L140	....
'17- 13	24	160	Good	R160	1.94	Paralysis; subluxation 6th cervical vertebra; laceration of cord; hem- orrhage.
.....	..	....	....	L150	....

RECORDS OF PERSONS WHO MAY HAVE HAD NORMAL KIDNEYS—

Continued

No.	Age	Stature, Cm.	Condi- tion of Nourish- ment	Kidney Weight, Gr.	Ratio to Stature	Pathological Diagnosis
39	80	160	Good	R165	2.03	Fractured skull, cerebral hemorrhage.
103	48	163	Good	L160 R145	1.18	Gunshot wound of head; meningitis.
108	24	175	Good	L150 E170	1.94	Gunshot wound in abdomen and neck; hemorrhage.
121	24	171	Good	R190	2.11	Fractured Base cranium; cerebral hem.
158	30	180	Good	L170 R150	1.83	No cause found for death; congestion of spinal cord.
'18- 91	25	155	Good	L180 B275	1.77	Shock; trauma lower abdomen; edema and congestion of lungs: aortic and mitral stenosis.

WHITE FEMALE

<i>Johns Hopkins Hospital:</i>						
1389	..	160	Good	B350	2.19	Placenta previa anemia of viscera.
1801	24	150	.....	R170	2.27	Perforated uterus; cystitis; throm- bosis vaginal veins; embolism pul. arteries.
1936	43	171	Good	B300	1.75	Operation myoma uterus; thrombus and embolus.
3133	30	163	Good	B300	1.84	Cerebral tumor; edema lungs; cystic ovary.
<i>Charity Hospital:</i>						
'14-354	46	122	Good	B240	1.97	Fracture of vault; subdural hemor- rhage.
426	37	...	Good	B240	....	Multiple fract. pelvis; cellulitis. Mul- tiple fract. skull and
'15- 10	29	145	Good	B250	1.72	Multiple fract. skull and face; lace- rations of brain; rupture of liver, kidneys, and lung: multiple fract. pelvis; fatty liver.
'16-293	64	150	Good	B270	1.80	Infarct of heart, myocarditis.
'17- 89	..	153	Good	B300	1.96	Intestinal obstruction; gangrene lower ilium.

NEGRO FEMALE

<i>Johns Hopkins Hospital:</i>						
1737	24	154	Good	B200	1.30	Intestinal obstruction: peritonitis oper- ation; hemorrhage.
3599	38	154	Good	L110	1.43	Pulmonary embolus and infarct. Sud- den death 24 hours after delivery.
5062	..	159	.....	R180	2.26	Puerperal uterus: maceration.
<i>Charity Hospital:</i>						
'16- 12	55	154	Thin	R230	2.87	Shock; acute traumatic peritonitis.
.....	..	...	....	L240	....

heart weight is due largely to the size of the individual, we may say that there is a true sexual difference in the kidney weight, the female kidneys being relatively larger than the male.

When the weights of the heart and kidneys are compared with the weights of the spleen and liver¹ a marked difference is manifested due to race: the liver and spleen of the white are larger than those of the negro. This is the first time that attention has been called to these differences, and we believe that they are fundamental and may have an important bearing in relation to medicine and evolution. The negro is probably being bred out, is certainly dying at a more rapid rate than the white in America, due to climate, bad living conditions and neglect, but the physical makeup of the race in America may have more to do with this than we can at present determine.

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¹ See Nos. 1 and 2, Vol. II, of this JOURNAL.

THE WEIGHT OF THE LEG IN LIVING MEN

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The following extract is taken from a letter received by Dr. Theodore Hough, dean of the Medical Department, University of Virginia, from the Red Cross Institute for Crippled and Disabled Men, New York City, and referred to the writer:

May 1, 1918.

. . . In your class room work with cadavers will it be possible to get the relative weight and dimensions of the leg to the rest of the body in amputations at the thigh and above and below the knee? As far as possible these statistics should be based on conditions obtaining in the live normal man. . . .

How to obtain from cadavers the conditions in live normal man was a problem. However, after a night and day of unceasing activity a plan was devised, a tank made, and the following day operations began.

Legs of cadavers and also of live normal men were dipped into water in the tank, and the water displaced was weighed at 70 degrees F. Lines were drawn around the leg at three levels, (1) one-third the distance from the ground to the upper end of the tibia; (2) at the level of the upper border of the condyles of the femur, and (3) at the level of the gluteal fold. The first two are the sites of election for amputation of the leg above and below the knee, while the third is the most convenient and definitely marked place about the hip, and the highest point at which the water could be made to flow from the tank when the whole leg was immersed, because the perineum impinged upon the edge of the tank.

The three lines divide the leg into three parts which will be called, (1) the ankle-foot, (2) the knee-calf, and (3) the thigh. The three together will be called the leg. The weight of this leg is less than the weight of the whole lower extremity if amputated at the hip because the part between the gluteal fold and the hip joint is not included. It would be difficult to amputate the leg at the hip joint in such a manner that when it has healed there will be the same amount of tissue left about the hip, hence it would be difficult to know the weight of the stump left at the hip. The weight given here for the thigh represents the weight without the stump at the hip.

The leg of an average sized cadaver with almost no fat but not emaciated, weighed 15.56 per cent more than the water it displaced, and the leg of an average sized cadaver with considerable fat although not extremely obese, weighed 10.94 per cent more than the water it displaced. The middle part of the leg, the knee-calf, was relatively heavier compared with the water it displaced than either the thigh or ankle-foot, and the thigh was relatively heavier than the ankle-foot. Only the right leg was weighed.

More than 500 students and soldiers between the ages of 18 and 40 years were then examined and measurements were made, but the method was improved slightly after the first hundred were passed and these were discarded. The records of 439 men are utilized in the present study.

The water displaced by the ankle-foot averaged 1.6 per cent of the body weight, that by the knee-calf 4.7 per cent, and that by the thigh 6.9 per cent. The actual weight of the parts of any leg can in consequence be approximately determined by multiplying the weight of the water displaced by 1.1556 if a lean leg, or by 1.1094 if a fat leg. If emaciated or obese the differences would no doubt be greater. The actual percentages obtained from the cadavers and from the living men were, 1.77 per cent of the body weight for the ankle-foot, 5.46 per cent for the knee-calf, and 7.69 per cent for the thigh, or a total of 14.92 per cent of the body weight as the total weight of the leg below the level of the gluteal fold; therefore the weight of both legs up to the gluteal fold would be about 30 per cent of the body weight.

An attempt was made to determine the differences due to stature, age and morphologic type.

DIFFERENCES DUE TO STATURE

The tall were separated by putting those above 170 cm. stature in one group and leaving those below 170 cm. in another. The amount of water displaced by the leg in these two groups is given in the following table.

TABLE I.
AMOUNT OF WATER DISPLACED BY THE PARTS OF THE LEG IN TALL AND
SMALL PERSONS
Ankle-foot

	Below 1000 Grams	Above 1000 Grams	Difference
Tall	30.6 per cent	69.4 per cent	
Small	59.5	40.5	28.9

Knee-calf

	Below 3000 Grams	Above 3000 Grams	
Tall	14.1 per cent	85.9 per cent	
Small	38.5	61.5	24.4

Thigh

	Below 4500 Grams	Above 4500 Grams	
Tall	39.2 per cent	60.8 per cent	
Small	55.5	44.5	16.3

The size of each part is seen to be larger in the tall than in the shorter subjects, and this difference is greatest in the ankle-foot, less in the knee-calf and least in the thigh portions of the leg.

DIFFERENCES DUE TO AGE

Those men examined who were from 20 to 25 years of age were found to have larger feet than those from 25 to 30 years, but this was due to the fact that more meso-phylomorphs were included in the series between the ages of 20 and 25 years and more hyper-phylo-morphs between the ages of 25 and 30 years—probably a fortuitous circumstance.

DIFFERENCES DUE TO TYPE

The type of the ear, nose, face, trunk and extremities was determined for each individual by the methods of the author published in previous papers, and this was done before the measurements were taken. Five morphological types were segregated on this basis, while 23 individuals remained unclassifiable, mixed or atypical. The average weight of the water displaced was calculated for the parts of the leg in each type by age and stature. No differences were found due to age, but the differences due to stature were noticeable. The two extreme groups of the five had a more marked difference in the small than in the tall. These two extreme types will be called the hyper and the meso, because the first is like the hyper-phylomorph and the second like the meso-phylomorph. The differences between these two types is greater than between any other types. The hyper has the long, slender nose, face, head, trunk and extremities, whereas the meso has a broader and more stocky build. The differentiation was made more from the type of ears than from the other characteristics, however.¹

¹ Bean, Robert Bennett. Some characteristics of the external ear of American whites, American Indians, American negroes, Alaskan Esquimos, and Filipinos. *Amer. J. Anat.*, 1915, XVIII, 201-225.

The hyper and the meso differ in physical condition, as given in Table II.

TABLE II.
PHYSICAL CONDITION

	Very Thin	Thin	Sl. Thin	Sl. Musc.	Musc.	Very Musc.	Sl. Fat	Fat	Very Fat	Total
Hyper	0	61	10	27	1	0	0	1	0	100
Meso	0	0	0	1	5	6	2	5	0	19

None was very thin, none very fat, and only one hyper was fat and not one meso was thin. The hypers were predominantly slender and the mesos predominantly stocky.

The sitting height in relation to stature brings out clearly that the small hypers have long extremities and short trunks, and the small mesos have short extremities and long trunks. While the sitting height of the tall hypers is 51.8 per cent and of the tall mesos 51.9 per cent of the stature, the sitting height of the small hypers is 52.6 per cent and of the small mesos 53.5 per cent of the stature. The sitting height in both groups is relatively less in the tall than in the small, which is what we would expect. The stature averages 176.4 cm. for the tall hyper, and 176.8 for the tall meso, but only 167.3 for the small hyper and 168.8 for the small meso. The sitting height of the small meso should really be slightly less than that of the small hyper, inasmuch as sitting height in general is inverse to stature, but the reverse is here true, hence this but emphasizes the difference between the types in this particular.

The body weight of the tall hyper is 59. kg. and of the tall meso 74.10 kg., and the body weight of the small hyper is 54.81 kg., and of the small meso 70.63 kg. The tall are heavier than the small and the meso much heavier than the hyper. The greater weight of the meso is due largely to heavier bones and muscles although partly also to fat.

The relative weight of the water displaced by the whole leg to the total body weight was found to be 13.25 per cent for the tall hyper and 13.9 per cent for the tall meso, and 13.0 per cent for the small hyper and 13.7 per cent for the small meso. The difference between the tall and small is slight, but the difference between the hyper and meso is greater, the meso having relatively heavier extremities. The water displaced by the ankle-foot and by the thigh is about the same in the two types, but the water displaced by the knee-calf is considerably greater in the meso than in the hyper, as shown in Table III.

TABLE III.

RELATIVE WEIGHT OF WATER DISPLACED TO TOTAL BODY WEIGHT

	Tall	Small	Tall	Small	Tall	Small
	Ankle-foot		Knee-calf		Thigh	
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Hyper	1.57	1.56	4.76	4.67	6.92	6.75
Meso	1.57	1.54	5.40	5.13	6.94	6.78

The meso has a heavier knee-calf than the hyper, and the lean legs of cadavers have relatively heavier knee-calves than the fat legs, but the meso is fatter than the hyper, therefore this but emphasizes the differences between the types. The heavy bone and muscle of the meso may account in part for the difference.

The foot of the hyper is long and narrow, small and slender, and the foot of the meso is short and broad, large and stocky. The foot of the meso averages .9 cm. longer and .77 cm. broader than that of the hyper, and the foot index of the meso is 39.1 while that of the hyper is only 37.5. The left foot is longer than the right and the right foot is broader than the left in both the hyper and meso, as it is in all the other types.

Circumferences taken at the three levels, (1), (2), (3) and at the calf are given in Table IV.

TABLE IV.

CIRCUMFERENCES

	Tall	Small	Tall	Small
	Above ankle		Above knee	
Hyper	20.5 cm.	19.9 cm.	33.8 cm.	32.6 cm.
Meso	23.0	22.3	38.7	38.0
	Calf (largest circumference)		Below hip	
Hyper	32.8 cm.	32.0 cm.	47.5 cm.	47.2 cm.
Meso	37.2	37.2	55.5	54.9

The averages of the two sides of the body are given in Table IV, because there is practically no difference between the two sides. The differences between the hyper and meso are greater than those between the tall and small.

The 10 most characteristic hypers are contrasted with the 8 most characteristic mesos in Table V. The differences are of the same

nature as those already noted but greater, and especial emphasis should be laid upon the sitting height and the weight of the knee-calf.

TABLE V.

PROPORTIONS IN PERCENTAGES

	Stat.	Sit. Ht.	Body Wt.	Water Displaced by		Ankle-foot	Total
				Thigh	Knee-calf		
Hyper	100	51.0	100	6.68	4.00	1.51	12.1
Meso	100	52.9	100	6.99	4.72	1.59	13.3

The ankle-foot of the hyper displaced 873 cc. of water, the knee-calf 2738 cc., and the thigh 3972 cc.; the ankle-foot of the meso displaced 1142 cc., the knee-calf 3875 cc., and the thigh 5262 cc.

In every measurement already given the meso shows nearer the general average than the hyper. The hyper is therefore the more distinct type.

The weight of the parts of the extremities as reported by Keith¹ are as follows: Upper arm, 3.3 per cent of the body weight, forearm 2.28, hand 0.8, total 6.38; thigh 11.6, leg 5.2, foot 1.8, total 18.6. No record is given as to the materials or methods, therefore comparisons are valueless. It is to be hoped that more detailed statements will be forthcoming.

STUDENTS VERSUS SOLDIERS

The records of 98 students attending the University of Virginia, and of 341 soldiers, drafted men who had recently entered the truck school near the university, may be contrasted. The students were between 18 and 26 years of age and the soldiers were between 21 and 40 inclusive. The stature of the soldiers was 97 per cent that of the students, but their weight was 103 per cent. The weight of the legs of the students was 28.92 per cent of the body weight whereas that of the soldiers was 30.08 per cent. The soldiers showed on the average a longer trunk and shorter, stockier legs than the students by actual measurement. Their feet averaged also broader and shorter. The bones of the students were found smaller and slenderer than those of the soldiers as determined by inspection and palpation, and their muscles were appreciably smaller. These differences were found by comparison of the whole of the two groups, and also in each of the five types subdivided by stature into 25 smaller groups. The soldiers

¹ Keith, Arthur. *British Medical Journal*, August 24, 1918.

in general were therefore smaller and stockier with more fat than the students, who were taller and slenderer. These differences may be explained in part by the fact that there are relatively more hypers among the students and relatively more mesos among the soldiers. Among the mesos the ratio of students to soldiers was 1 to 6.4 and among the hypers the ratio was 1 to 3.6. The soldiers were largely from the laboring classes and the students from the leisure classes, and both, almost without exception, represented the Old American stock who have been in this country for at least three generations, almost entirely in Virginia.

GENERAL AVERAGES

The average stature of the 439 men was 173.5 cm., the average sitting height 89.97 cm., the relative sitting height 51.8 per cent. The total body weight averaged 63.9 kilograms. The length of the right foot was 26.07 cm. and of the left foot 25.95 cm., and the breadth of the right foot is 9.97 cm. and of the left foot 9.84 cm. The right foot showed to be larger than the left and the foot index was 37.98 and 38.24 for the right and left foot respectively; there the right foot is relatively long and narrow and the left foot relatively broader and shorter. This was true in the general average and also when the men were separated into groups by type and stature. The right ankle circumference averages 21.8 cm. and the left 21.7 cm.; the right calf circumference was 34.7 and the left 34.2; the right and left knee circumferences were the same, 36.3; and the right thigh circumference was 51.6 cm. and the left 51.2 cm., showing the right leg to be slightly larger than the left.

CONCLUSIONS

A method is devised whereby the weight of any part of the leg in the living may be determined by weighing the amount of water displaced by the part. By this method it was determined that:

Thin legs weigh more than fat ones and bony and muscular legs weigh more than thin ones, in proportion to their volume.

The approximate weight of the lower extremities up to the gluteal fold is about 30 per cent of the body weight, the weight of the right thigh is about 7.69, the right knee-calf 5.4, and the right ankle-foot 1.77 per cent of the body weight.

The right foot is larger than the left, it is also longer and narrower, and the right leg is slightly larger than the left, otherwise the two extremities are alike.

Differences due to age were not found, but differences due to stature are considerable, and differences due to morphological type are greater than either of the other two.

The meso-phylomorph has shorter, stockier, heavier, bonier, and more muscular legs than the hyper-phylomorph, and the feet of the former are shorter, broader, stockier and larger than of the latter. The differences are greatest about the knees.

In any attempt to determine the weight of the parts of the leg in the living, consideration should be given to the stature and type, as well as to the physical condition.

ANTHROPOMETRY

ALEŠ HRDLIČKA

C. ANTHROPOMETRY ON THE LIVING.—INSTRUMENTS

The instruments used in measurements on the living, with the exceptions of the compasses and the tape, are different from those used in measuring skeletal material. Also, there is not yet as complete uniformity in these instruments as might be desirable. Matters of this nature in all branches of science are largely those of evolution and the eventual survival of the fittest.

Most of the anthropometric instruments or their prototypes owe their development to the pioneers of the *École d'Anthropologie*, Paris, and more particularly to Paul Broca, the first director of the *École* and the father of anthropometry. The ingenuity and great service of Broca in this regard have not yet received a due appreciation. The instruments are partly non-metallic and partly metallic, partly fixed and partly free, and in some instances they differ somewhat according to whether they are to be used in the laboratory or in the field.

The instruments essential for measurements on the living are the planes or rods for measuring the stature, sitting height and the span; the spreading and the sliding compasses or calipers, for measuring the head, the facial parts and the hands; the large sliding compass for measuring the diameters of the chest, pelvis and feet; the anthropometric tape for measuring circumferences of the head, body and limbs; and certain accessories such as the dynamometer, color scales etc. They may briefly be described as follows:

1. *The Anthropometric Plane of Broca*.—Made of thoroughly seasoned wood, 1 meter high, 12.5 cm. broad, 1.5 cm. in thickness, stained dull yellow, varnished; graduated in centimeters full across, in half-centimeters one-half or two-thirds across, and in millimeters along the left or both margins. Marking plain, easily legible. The upper edge provided with two eye-screws or other device for hanging; and the plane may be hinged at the 70 or 75 cm. mark for easier transportation (A. H.). 1a. *Square* (Adjunct).—Two pieces of light

wood, 18 cm. long by 12 broad by 1.2 in thickness, joined at right angles, and provided on the inside, in the middle line, with a narrow strip serving as a handle; stained and varnished as 1.

Use: for measuring stature and sitting height. In the laboratory it is of some advantage to use a separate plane for each of the two measurements, the plane for measuring stature being fastened one meter above the floor, while that for measuring sitting height is fastened directly above the bench on which the subject sits for this measurement. In the field, one plane fastened one meter above the floor or a level piece of ground, will do for both measurements, the height of the bench in the case of sitting height being subtracted from the total measurement obtained.

Modifications.—In the original planes of Broca, at a distance of 1 cm. from the left border, there was a fairly deep groove, which served for a graduated sliding square by which one could measure the stature as well as the ear and shoulder heights, and, together with another appliance, also the facial angle; but all these have now become obsolete.

Paper or Cloth Plane or Tape.—At the occasion of certain recommendations made by the Committee on Anthropology of the National Research Council, in connection with the impending measuring of large numbers of recruits for the United States Army, the writer proposed¹ that instead of the more costly plane, special inextensible linen or paper strips be printed to take its place. A strip of this nature, 8 to 12 cm. broad, printed accurately on inextensible and unshrinkable paper or other material (ordinary materials change considerably!), is easy to work with and has the advantage of cheapness as well as ease of transportation. They may be made in segments of 50 cm. In cases of necessity a scale may be improvised on the wall or other vertical, or on a strip of paper; or the ordinary anthropometric tape may be fastened to the wall, rod, etc. An improvised paper scale should be well varnished on both sides, to prevent puckering.

2. *Anthropometer.*—A number of related instruments are embraced under this name. Their common principle is that of a graduated rod, single or in sections, fixed to a pedestal or with a free lower end, and provided with a sliding horizontal branch. They are used for measuring stature and sitting height, instead of the above described plane, and are particularly advocated for work in regions where no vertical such as a wall or tree may be found on which the plane might be fastened.

¹ AM. J. PHYS. ANTHROP., 1918, I, 81.

The most useful modifications of this instrument are the *Anthropomètre* and the *Toise anthropométrique* of Topinard,¹ and the metal rod of Martin. The terminal part of the last named has both a fixed and a sliding branch and may serve for the purposes of both the anthropometer and a large sliding compass.²

These instruments are of value and continue to be employed by various investigators, particularly those of the Zurich school; but they are not as handy, easy of manipulation or accurate as the fixed plane. Moreover, there is a rather important difference in their mode of employment by the different observers, some using them in the same way as the plane, which secures a standard posture of the subject, while the followers of Martin place them in front of the subject, which makes the regulation of posture uncertain.

The writer advocates the use of the plane, for the fastening of which one can always find or provide some vertical.

Individuals met with on the road, in the fields, etc., may be measured against any suitable object and the height determined by the ordinary tape.

3. *Horizontal Plane* (Accessory).—For laboratory purposes and for field work where numerous subjects are to be measured, this is a useful accessory facilitating the measurement of the span. It consists of a light wooden plank, or paper strip, 30 cm. broad by 60 cm. in length, graduated from 140 to 200 cm. For the purposes of measuring the span a vertical wooden strip is fastened on the wall 80 cm. from and parallel with the left edge of the vertical plane, to serve as a "point d'appui" of the longest finger of the right hand of the subject. The horizontal plane is then fastened to the wall at a distance of 140 cm. from this vertical strip (or 47.5 cm. to the right of the vertical plane), and serves for the determination of the span length, the exact manner of taking which will be described under "Methods." A serviceable scale of this nature may be improvised on the wall. A paper scale must be well varnished.

4. *Wooden Bench* (Accessory).—For measuring height sitting (and other purposes). For laboratory use and in measurements on American people (who on the average are tallest of all Whites), the most serviceable bench is one of 50 cm. in height, 50 cm. in breadth, and 32

¹ *Élém. d'Anthrop. gén.*, 8°, Paris, 1885, 1116–20. Made by both Mathieu and Collin, Paris.

² Made by P. Hermann, Zurich (Catalog: *Wissenschaftliche Messinstrumente für Anthropologie nach Prof. Dr. Rud. Martin*, Zurich).

cm. anteroposteriorly. For work among shorter peoples, and especially among children, the bench must be lower, the aim being for the thighs of the subject to be flexed at right angles to the trunk. In the field, any convenient well-made box may be used.

The laboratory bench is stained light mahogany or other suitable color, and varnished. It should be made of well seasoned wood to prevent appreciable changes in particularly dry or damp weather.

5. *Plumb and Level* (Accessory).—When using an anthropometer, various measurements on the body, such as the sternal height, shoulder height, etc., may be taken direct, but unless the subject stands against some vertical there are always chances of error owing to uncertainty as to correctness of position. When using the Broca plane we may get all these measurements in a simple and more accurate way with the help of a small level and plumb. The level is made in the laboratory. It consists of a narrow glass tube, 16 cm. long, filled with alcohol containing a small bubble of air, and marked with a red ring at the middle. The plumb is a pointed piece of lead or other metal, suspended on a strong linen or silk thread. The subject stands against the plane in the same position as for the determination of stature; the level is applied to the landmark from which the measurement is to be taken, and held there horizontally by the left hand; the plumb is then dropped to the floor, without any slack, and the thread is pinched by the thumb nail and forefinger at the height of the lower edge of the level. The subject then steps aside, and the measurement taken is ascertained on the scale of the plane. The procedure is very simple.

6. *The Spreading Calipers* (*Compas d'épaisseur*).—This is one of the indispensable and most useful instruments in Anthropometry. It is manufactured in several varieties. These are, (1) the small compass of Broca, made by Collin in Paris, as well as—with slight modifications—by Hermann in Zurich; (2) the standard larger compass of the Paris École d'Anthropologie, made for many years before the war by Mathieu as well as by Collin, in Paris; (3) the Bertillon compass, made by Collin; and (4) the Hrdlička compass made in France (Collin) and United States (Fig. 1).

The several instruments differ in usefulness. The small compass is more adapted for work on the skull than for that on the living, although it is also used for the latter purpose. The larger standard compass is an excellent instrument for ordinary anthropometric work on the living, as well as that on the skull. The Bertillon compass is

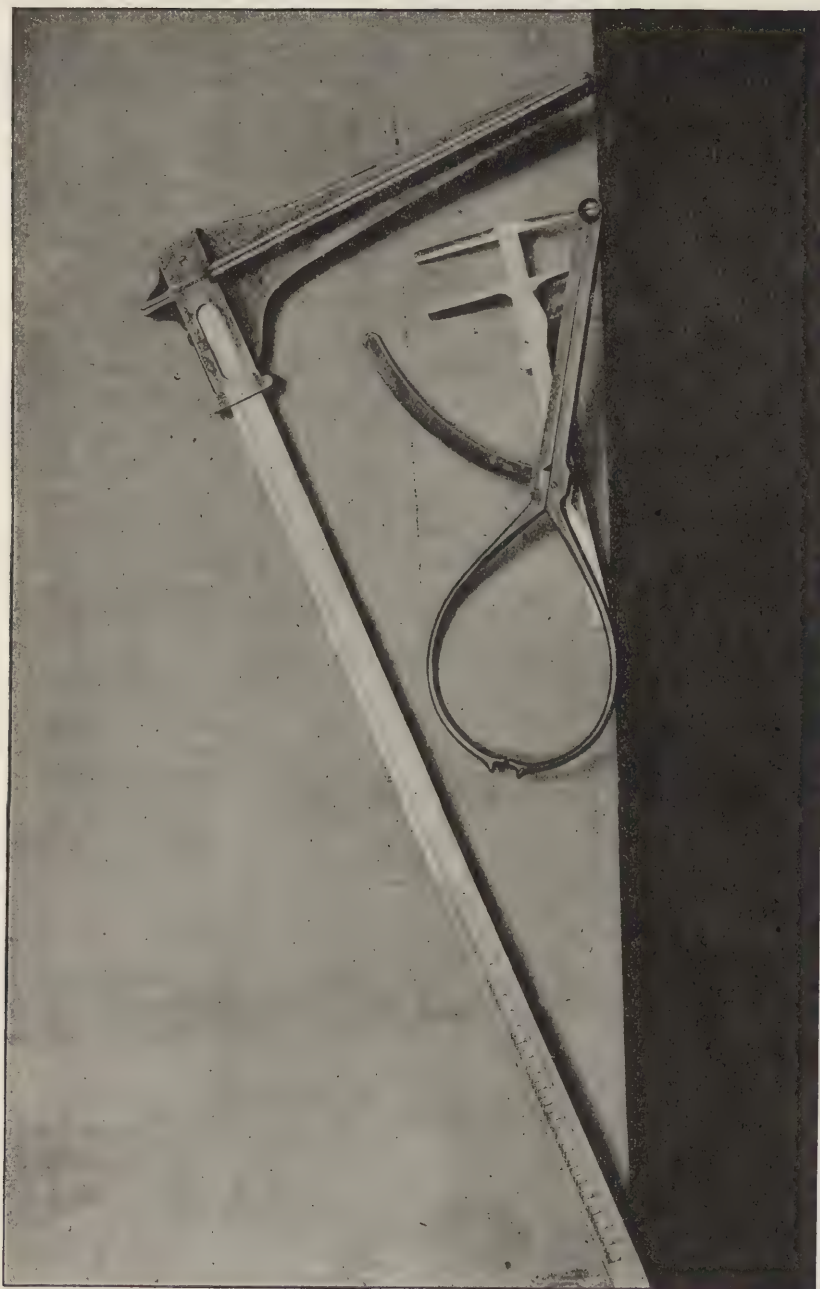


FIG. 1. The Anthropological Compasses. U. S. National Museum.

practically the same as the preceding, but is marked by a greater rigidity as well as bluntness of the branches, and a reduction of the scale. The Hrdlička compass possesses certain adaptations and needs a special description. Of the three older forms of calipers only one, the standard compass of Mathieu, could be used in measuring the height of the head. This measurement is one of growing importance and various methods as well as instruments have been devised in the past for securing it on the living. One of the easiest of methods, for many years practised by the author, was to introduce the branches of the standard compass into the auditory meatus, bring the scale of the instrument over the bregma, note the spread, determine with the rod of the sliding compass the distance from the bregma to the lower edge of the scale, and by a simple arithmetic procedure, obtain the height of the head. But these older instruments had certain disadvantages when used for this purpose, which were a somewhat inadequate size of the branches in the cases of large heads, an oblique direction of the terminal parts of the branches, particularly when sufficiently dilated for introduction into the ears, and the facility with which the branches penetrated deeper into the ear than required. To obviate these disadvantages, the writer in 1912 visited MM. Collin in Paris and gave directions for making compasses with slightly larger branches; with the terminal parts horizontal at the spread of 10 cm.; and with a guard on the lower portion of each branch 8 mm. from the point, to regulate the distance of introduction into the meatus. The resulting instrument is but imperceptibly heavier than the older standard compass of Mathieu; it serves with equal facility the same purposes; and in addition it is thoroughly well adapted for measuring the height of the head.

7. *The Sliding Compass (Compas glissière).*—This instrument is too well known to need special description. Figure (1) shows the compass of Collin, which is almost identical with that of Mathieu and is a well-balanced and most useful instrument. The Martin sliding compass shows slight differences, which appear to be matters of personal choice rather than those of additional usefulness.

8. *Large Sliding Compass.*—There are several instruments of this nature, some made of wood (Paris, American), others of wood with steel branches (Topinard, Manouvrier), and still others wholly of metal (Martin, Hrdlička). Except the wooden and the author's instrument, they have in common the disadvantage of narrow branches, which in measuring the thorax are liable to be pressed into the inter-

costal spaces; and not seldom, especially in the wooden compasses, the branches are not rigid enough, which results in some error of measurement.

The writer's instrument consists of a hollow rod, 70 cm. long, 2.2 cm. broad and 0.8 cm. thick, made of well nicked and welded brass strips; and of aluminum branches, 26 cm. long (in the free) and 3.5 cm. broad. It is light, very serviceable, as well as durable, easy working, and accurate (fig. 1).

9. *Tapes*.—The best anthropometric tapes are made in Paris by instrument makers who stand in connection with the École d'Anthropologie. They are made of linen, painted grayish-white, are accurate and non-elastic. The layer of paint and varnish on each side is light and does not crack. One of these tapes gives months or years of service.

Steel tapes are easier to obtain but less advantageous. They are not so easy to manipulate and read; they are cold and sometimes they break. The steel tape may be used, however, with some advantages on skulls and bones.

10. *Standard Meter* (Accessory).—A strong lamina of brass, 1 meter long, graduated in centimeters and millimeters, standardized in France. Obtainable through the French manufacturers of anthropometric instruments. Very useful for testing accuracy of tapes and graduated planes. A laboratory instrument.

11. *Standard Block* (Accessory).—Block of wood or preferably metal, aluminum or brass, for testing the accuracy of calipers, at 5, 10, 15, and 20 cm. spread. The best appliances of this nature are made of metal. They are laboratory accessories.

12. *Dynamometer* (Collin or Mathieu).—Description unnecessary. No handles requisite for ordinary tests.

Other dynamometers are made, particularly in England and in the United States, but the results obtained by these are not strictly comparable with those obtained by the classic French instruments, and the latter are to be preferred on account of their simplicity, long use in anthropometry, and their handiness.

13. *Weighing Scales*.—The question of weighing scales in Anthropometry is one of considerable difficulty, for in general they are heavy and difficult if not impossible of transportation. In the United States and in England, moreover, we have practically no metric scales and must use those of the old system, which necessitates a subsequent conversion of the figures. Suitable weighing scales for infants in

both the old and the metric system are obtainable in Europe as well as in this country, but even these are heavy for transportation. Fortunately, weight in adults, on account of its great variation, is not a measurement of prime importance.

14. *Standards for Colors of Skin, Eyes, Hair* (Accessories).—Though generally satisfactory observations on skin, eye and hair color are possible without the use of standard color scales, the difficulties of nomenclature and of uniform instruction in different laboratories, have nevertheless caused a strong desire for a series of standards with which the colors found could be matched, and by the number or name of which they could be recorded. The result has been the preparation, by various workers, of scales of colors intended to facilitate this important part of anthropological observation. None of these scales represents all that could be wished for, but all have their uses.

Skin Colors.—There are several scales for matching skin color. The best known and one that has been most used is that of Broca,¹ the others being those of von Luschan,² Rudolf Martin,³ and Gustav Fritsch.⁴ Also there are other methods,⁵ among them direct painting in the field of the shades observed, a procedure which meets with only limited success on account of the changes in the color of the pigments during drying.

Until an international agreement on some one scale is reached, the observer may use either of those now in existence, it being understood that in his report he will state which one he employed. Or he may use simple descriptive terms which will be given under "Methods" and which in most cases are quite sufficient.

Color Standards for Eyes and Hair.—The color of the eyes and the hair, as that of the skin, may be determined by unaided observation, and with many primitive tribes in general the task is quite simple.

¹ Printed originally in his "Instructions générales pour les recherches Anthropologiques," *Mém. Soc. d'Anthrop.* Paris, 1864, II; 2e éd., 16mo., Paris, 1879; repr. on larger scale in Hrdlička (A.)—Directions for collecting information and specimens for physical anthropology, Bull. U. S. Nat. Mus., Pt. R. No. 39, Wash., 1904; also, in part and with different numbers, in the "Notes and Queries on Anthropology," of the B. A. A. S.

² v. Luschan's scale consisting of a series of colored glass tablets, is made by Hermann, Zurich.

³ Mentioned by G. Fritsch.

⁴ Fritsch's colors, on painted paper strips, may be had from W. Pfund, Berlin; the method is described in the *Mitt. Anthropol. Ges.* Wien, 1916, xvi, 183-5.

⁵ Gray (J.), A new instrument for determining the color of the hair, eyes and skin (Man, 1908, viii, 54); the Bradley's color top; the trade color scales; etc.

But among mixed groups, and particularly very mixed Whites such as the Americans, these procedures become more difficult and call for careful instruction as well as experience, or for the use of adequate standards. Such standards exist both for the eyes and the hair.

For the eyes there are several color scales, such as that of Broca,¹ Bertillon,² the Medical Department U. S. A.,³ etc. In addition we have the artificial eyes of commerce, the glass eye standards of Galton,⁴ and the "Augenfarbentafel" of Martin.⁵ For hair, samples of actual human hair have been used (f. e. by Pearson—*Biometrika*, 1907, v, 474); and since 1907 we possess the good though still not fully sufficient artificial-hair standards of Eugen Fischer.⁶

15. *Additional*.—Occasionally it may be found necessary or advisable to use certain accessories in anthropological work on the living, such as the finger-print outfit, or the apparatus for determining blood-pressure, chest capacity, sensibility, etc.; but these are well-known medicolegal or physiological instruments which do not call for a specific description in this place.

SELECTION OF MEASUREMENTS

As already mentioend, the number of practicable measurements on the human form, both in life and on the remains, is legion. Moreover, every one of these measurements may be of anthropological value if taken by the same method on sufficiently large numbers of individuals of various racial, environmental, social, or defective groups. But it is self-evident that for practical purposes we must make for each separate piece of investigation a careful selection of those measurements which on the one hand will fulfill the objects of our study, and which on the

¹ Échelle chromatique des yeux. Instructions Anthropologiques générales, 2 ed., Paris, 1879. Consists of four series of colors, brown, green, blue and grey, with five shades to each.

² *Bull. Soc. d'Anthrop.*, Paris, 1892, 384-7; Tableau des nuances de l'iris humain, Paris, F. Durand.

³ Twelve shades, on black strips; Queen & Co., Phila. Same firm furnishes 31 "Standard Colors for Artificial Eyes," which are slightly more useful.

⁴ Obsolete.

⁵ To be had through the Anthropologische Institut der Universität, Zürich. Consists of a case with aluminum plate and 16 glass eyes which protrude from eyelid-like apertures in the plate.

⁶ Made by F. Rossett, Freiburg i. B. Consist of a metal case containing 30 different colored samples of artificial (cellulose) hair. Desc. by Fischer in "Die Bestimmung der menschlichen Haarfarben," *Korbl. d. D. Anthrop. Ges.*, 1907, xxxviii, 1-7.

other hand will enable us to secure observations on the largest possible number of individuals, and not impede a prompt preparation of the data for publication.

The selection of the measurements for a particular piece of study is not as difficult as might seem, once we are well conscious of the exact aims of the study to be undertaken. If it is to be a study of the laws of growth in the child, we shall naturally devote our attention mainly to the dimensions of the body as a whole and to those of its main segments, the head, neck, trunk and limbs. We may disregard in this case the growth of the secondary parts such as the ears, nose, mouth, hands and feet, and possibly even the development of the face as a whole, which should form the subject of special studies. Should our object be racial comparison, the main attention will be centered in stature, sitting height, possibly the span, and the dimensions of the head, face, nose and perhaps also the ears. But if the object of the research is to be a comparison of two or more environmental or social groups, then it will be necessary to pay close regard, besides the measurements just mentioned, also to those of the shoulders, chest, hands, and feet, and possibly also to those of special parts of musculature. Same rules will naturally be observed in work on the skeleton.

Besides such more general studies there will be occasions for research on single parts or organs, which will call for detailed measurements of these, together with those on parts that stand in important correlation. Finally, in the study of individual variations of parts, we may practice detailed measurements which will be used on no other occasion and which it would be of no use to complicate by measurements on unrelated parts or organs.

In preparing for measuring the living, the student must consider, in addition to the interests of the work, also the sensibilities of his prospective subjects. He must particularly bear in mind that modesty, though it may differ in shade or degree, is a universal virtue which cannot be offended with impunity. Fortunately, measurements which would call for exposures likely to be resented are in general those of secondary value only. Moreover, a light garment will in no way interfere with the accuracy of measurements, as for instance those of the chest, the maximum breadth of the pelvis, etc. To demand more than an accustomed exposure would spoil the chances of success of the investigator in many a tribe of primitive people and might even prove dangerous.

Blanks.—The subject of blanks has already been covered in the main (p. 183). Anthropological literature contains many examples of proposed universal blanks, from those of Broca, Topinard, and the British Association, to those of von Luschan and the impracticable ones of Török or Rudolf Martin. The essentials are however the same in all, and if any rule should be given the student in this connection it is to begin his independent work with these essentials, and let experience advise him as to extensions.

The general type of blanks used on the living by the author are reproduced on the next pages. Though based on long experience and seeming to him satisfactory, they are not given here to be blindly followed. He himself modifies them according to occasions. He may add, for instance, the sternal notch height, breadth of shoulders, and breadth of the pelvis; he may eliminate the span, the ear measurements and other determinations. The blanks relating to skeletal material will be dealt with later. Author's general blank for children, which on account of the diversity of ages is printed on an individual sheet, is also here shown. It is equally subject to modifications, according to circumstances. Both sets of the blanks here given will be seen to lack various measurements which have been used more or less extensively in anthropometry, such as the various subsidiary heights (to shoulder, nipples, xiphoid, umbilicus, pubis), those that apply to the various segments of the limbs, etc. The reason is that except in special studies none of these measurements is of prime importance, and in many cases either the exposures they call for or the uncertainty of their landmarks, offer serious difficulties to effective, accurate work. In case of exceptional opportunity or special desire of the observer, any of these measurements may, of course, be included in the general scheme.

LANDMARKS AND METHODS

So far as measurements on the living are concerned, it will be of advantage to speak of landmarks and methods jointly. Moreover, only those measurements will be considered in this place which are practiced in the anthropometric work of the Smithsonian Institution. Information as to others may be readily obtained from Broca,¹ Topinard,² Martin,³ and the existing International Agreements.⁴

¹ Broca (Paul), *Instructions anthropologiques générales*. 12mo, 2e d., Paris, 1879.

² Topinard (Paul), *Éléments d'Anthropologie générale*. 8°, Paris, 1885.

³ Martin (Rudolf), *Lehrbuch der Anthropologie*. 8°, Jena, 1914.

⁴ AM. J. PHYS. ANTHROP., 1919, II, 57, 61.

ANTHROPOLOGY

Expedition

A.

Measurements:

Tribe.

No.	Name	Sex	Approx. Age	Deformation of Head	Stature	Max. Span	Excess of Span Over Height	Sitting Height	Sitting Height, Per Cent. of Total Height	Head: D. Ant. Post. Max.	D. Lateral Max.	Cephalic Index	Height Base of Mecus Line to Bregma	Cephalic Module	Cephalic Mod- ule vs. Height	Face: Menton- nasion	Menton- crinion	Height of Fore- head (Nasion- crinion)
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B.

No.	Diam. Bizygom Max.	Facial Index	Physiog- nomic Index	Diam. Frontal Min.	Diam. Bigonial	Nose: Height to Nasion	Nose, Width Max.	Nasal Index	Mouth Breadth	Chest, D. Lateral	Chest, D. Ant. Post.	Chest Index	Left Hand, Length	Left Hand, Width	Hand Index	Left Foot, Length	Left Foot, Width	Foot Index	Left Leg Circum. Max.
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ANTHROPOLOGY

Expedition

Tribe.

Inspection:

C.

No.	Skin Color	Hair			Moustache and Beard		Eyes		Forehead	Supra-orbital Ridges	Eye-slits	Malars
		Color	Char-acter	Gray	Lost	Color	Char-acter	Iris				

D.

No.	Nasion Depression	Nose	Nasal Septum	Lips	Alveolar Prognathism	Chin	Angle of Lower Jaw	Body and Limbs	Toes	Breasts

ANTHROPOLOGY

Expedition

Tribe.

Physiological:

E.

No.	Temperature (Sub-Lingua)	Pulse	Respiration	Time of the Day	Present State of Health, Etc.	Left Ear			Teeth	Hand Pressure		Weight
						Height	Breadth	Index		Right	Left	
						Max	Max	Max				

SMITHSONIAN INSTITUTION
 UNITED STATES NATIONAL MUSEUM

 People.....
 Tribe..... Locality..... Sex.....

Measurements		OBSERVATIONS
No.....	Age (real)..... (appar).....	Color of skin.....
Deformation of head.....		Color of eyes.....
BODY:		Color of hair.....
Stature.....		Nature of hair.....
Max. finger reach.....		Forehead.....
Height sitting.....		Supraorb. ridges.....
Height to sternal notch.....		Eye-slits.....
HEAD:		Malars.....
Length.....		Nasion depress.....
Breadth.....		Nose.....
Height (biaur. l.-bg.).....		Nasal septum.....
FACE:		Lips.....
Length to nasion.....		Alveol. progn.....
Length to crinion.....		Chin.....
Breadth, bizygom.....		Angle of l. jaw.....
Diam. front min.....		Body and limbs.....
Diam. bigonial.....		Toes.....
Nose:		Breasts.....
Length to nasion.....		PHYSIOLOGICAL:
Breadth.....		Pulse.....
Mouth:		Respiration.....
Breadth.....		Temperature.....
Left Ear:		Time of day.....
Length.....		State of health (see tongue).....
Breadth.....		Strength:
MISCELLANEOUS:		Pressure { r. hand.....
Chest:		{ l. hand.....
Breadth at nipple height.....		TEETH:
Depth at nipple height.....		1st { upper { r.—i. 1, 2, c, pm. 1, 2
Left Hand:		{ l.—i. 1, 2, pm. 1, 2
Length.....		1st { lower { r.—i. 1, 2, c, pm. 1, 2
Breadth.....		{ l.—i. 1, 2, pm. 1, 2
Left Foot:		2d { upper { r.—i. 1, 2, c, pm. 1, 2,
Length.....		{ m. 1, 2, 3
Breadth.....		2d { lower { l.—i. 1, 2, c, pm. 1, 2,
Left Leg:		{ m. 1, 2, 3
Girth, max.....		2d { lower { r.—i. 1, 2, c, pm. 1, 2,
Weight of Body.....		{ m. 1, 2, 3
(With shoes and dressed, but without outer garments.)		

The directions given will for the most part strictly follow those of the International Agreements, as far as these go; but for the benefit of the student there will be a number of explanatory changes in the wording, and also a number of additions, all of which will be plainly indicated.

MEASUREMENTS OF THE BODY: *Stature*—The stature is to be measured by the anthropometric plane of Broca, or an equivalent strip or tape (see under Instruments), with a square. The subject stands erect, on level surface, with heels together, and with these, the buttocks and the shoulders applied to the vertical (wall, rod, tree, etc.) on which is fastened the anthropometric plane, while the head is held so that the visual, as well as the biauricular axis is horizontal. The occiput will frequently touch the vertical in this position, but it is not obligatory that it should do so. The arms hang in natural position. The height of the vertex is ascertained by means of the square. Observer stands slightly to the left of the subject, manipulates the square by holding it lightly in the left hand, and reads the measurement on the right margin of the plane. The square is applied to the head horizontally, twice or three times in succession to facilitate correct reading, and with sufficient impact to feel the skull resistance. Care must be exercised not to make an error in the reading.

The method as given here differs slightly from the Geneva agreement in that it provides, through the application of the heels, buttocks, and shoulders to the vertical, of a strictly standardized posture which will also serve for other measurements. There is no appreciable difference in the measurement by the two methods if taken with sufficient care; but the modification here given assures a greater uniformity of results as well as a greater ease of procedure. It is moreover strictly speaking the method of Broca¹; and it is the method of the Geneva International Agreement for sitting height (q. v.). It is incongruous to take the total height in one standard position and the sitting height in another.

Should the development of the buttocks interfere, as may occasionally happen in women, the subject is not forced against the vertical, but allowed to stand slightly in front of the same.

2. *Height to the Supra-sternal Notch*.—Instruments: A level and a plumb, or the anthropometer. The level has already been described.

¹ Instructions, etc., 119. "Le *vertex* est le point culminant de la tête, lorsque le sujet debout et adossé au mur regarde droit devant lui. La hauteur du vertex n'est autre chose que la taille du sujet. On la mesure en faisant descendre la grande équerre sur sa tête."

In the absence of the specially made tube, use may be made of a flat piece of wood, such as the ordinary tongue depressor, which is applied edgewise into the notch. Method: Subject retains position held during measurement of stature. The level is pressed into the deepest part of the sternal notch, brought to and supported in horizontal position, the lead is dropped to the floor or ground with the string just clearing the abdomen, the cord is pinched by the thumb and forefinger nails at the lower edge of the level, the subject steps aside, and the measurement is read off against the vertical plane.

With the anthropometer the measurement is taken direct, with the instrument in front of the subject.

3. *Shoulder Height*.—This is an unsatisfactory measurement, on account of the frequency of a faulty holding of the shoulders. It should be taken on both sides, record being made either of both the measurements or of their mean. Landmarks: the upper surface of the outermost part of the acromion. Method: Same as with measurement from sternal notch.

4. *Span*.—The horizontal distance from tip of medius to tip of medius, in maximum extension of the arms. Instruments: A vertical molding (or wall) against which to apply one of the fingers, and a broad horizontal scale on which to take the measurement (see under "Instruments"). Method: The subject whose stature and perhaps also sternal or shoulder height have just been measured, extends one of his arms horizontally until the medius is applied to the provided vertical, and raises the other arm into a similarly horizontal position. The observer applies his thumb nail to the medius of the free arm, and watching the subject, as well as the continued application of the medius of the arm first raised to the vertical, he directs him or her to expand the arms as much as possible. As the expansion takes place the thumb of the observer is pushed along the scale, until the maximum is reached. That the latter has been reached can usually be told from the attitude and expression of the subject. The arms are then dropped and the measurement indicated by the nail of the observer's thumb as read on the scale. The whole procedure is quite simple. Normality of the parts entering into the measurement is of course essential.

5. *Sitting height*.—The Geneva Agreement stipulates as follows:
"Sitting height.—The subject sits on a horizontal and resisting seat about 30 to 40 cm. high (this height being proportionate to the stature of the subject): the knees are flexed; the dorsal aspect of the trunk is

to make contact with a vertical plane, or with the anthropometric rod at two points, viz., in the sacral region and again between the shoulder blades. The axis of vision is horizontal. The height of the vertex above the surface of the seat is to be measured."¹

The directions here given need no alteration. The height of the bench for American adults, whose average stature is superior to that of most other Whites, should not be lower than 45, and may conveniently be 50 cm. (see under "Instruments"). In taking the measurement, special care must be taken in each case that the sacral region be well applied to the vertical. The occiput in this position generally touches the vertical plane.

MEASUREMENTS OF THE HEAD: *Length*.—The maximum glabello-, occipital diameter of the vault.

Instrument: The spreading compass or calipers (compas d'épaisseur, Broca or Hirdlčka).

Landmarks: Anteriorly—the most prominent point of the glabella; posteriorly—the most prominent point on the occiput as shown by the maximum determinable spread of the branches of the compass (Intern. Agr.).

Method: According to older methods (see Bertillon, Martin), the end part of each branch of the instrument was held in one hand, as in measuring the face. For measurements of the head this is somewhat clumsy. A better method is to hold the compass so that its butt (or joint) rests on the hypothenar eminence of the hand, the two proximal parts of the branches reposing respectively on the ball of the medius and on the second joint of the forefinger, while the thumb holds the instrument to the hand. The observer applies the thumb and middle finger of his left hand, in contact, to just below the glabella, places the free end of the left branch of the compass on these fingers so that the point touches the glabella, and applies the left forefinger over the end. This gives a ball-and-socket arrangement which enables the measurer to hold the point of the left branch of his compass steadily over the glabella without fear of displacement. This branch of the instrument needs no further attention. The right hand is now moved partly around the proximal part of the compass, so that the two branches rest on the ball of the fourth and on the second joint of the middle finger, and are held and controlled by the ball of the thumb and the ball of the forefinger. This hold permits not only an easy handling of the instrument with perfect control,

¹ AM. J. PHYS. ANTHROP., II, 1, 64.

but affords also a great facility for regulating the pressure. The free end of the right branch is then applied over and somewhat to one side of the median line of the most prominent part of the occiput, and is moved up and down in saw-tooth fashion from side to side of the occiput until the maximum length is encountered. The eyes watch only the scale. The ease of manipulating the instrument when handled in this manner is very gratifying. (Fig. 2.)

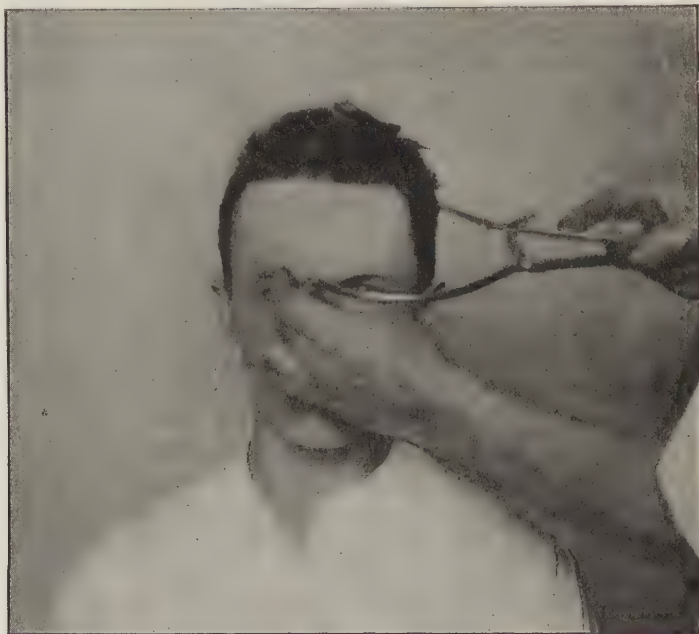


FIG. 2. Method of holding instrument in measuring the length of head.

Breadth.—The greatest transverse diameter in horizontal plane which can be found on the vault by the spreading compass (compas d'épaisseur, Broca or Hrdlička).

Landmarks: Determined solely by the maximum breadth of the skull above the supra-mastoid and zygomatic crests (Intern. Agr.).

Method: The instrument is held as in first position for measuring the length, and this position is retained. The left hand is placed lightly on the top of the head of the subject, assisting in bringing the latter into the most convenient position for taking the measurement; the instrument is applied horizontally somewhat above what appears

to be the maximum breadth, and is moved in a zigzag way antero-posteriorly, descending and again ascending by zigzags, until the maximum breadth is found. The eyes watch only the scale. It is necessary to repeat the movements in an ascending and possibly once more in a descending direction, until the observer is positive that the maximum breadth has been ascertained.



FIG. 3. Method of holding instrument in measuring the breadth of head.

*Height.*¹—The height from the middle of the line connecting the floor of the auditory canals to bregma.

Instrument: The spreading compass of Hrdlička (Fig. 1).

Method: The instrument is held by the right hand just below the joint. The head of the subject being steadied by the left hand, one branch of the instrument is gently introduced into the left ear as far as the guard permits, and the same is followed with the right ear.

¹ The Monaco Agreement stipulates that the height of the head be taken from "the superior border of the auditory opening" to the "vertex"; but no satisfactory method for taking the measurement is offered or has ever been devised. The method here described has been practiced by the author since 1898 and found quite effective.

The compass is then slightly raised to assure penetration as far as the guards allow, is taken hold of a short distance above the scale by the left hand, allowed to sag down by its own weight, and held in position. The ulnar side of the hand that holds the compass should for greater steadiness repose on the head of the subject behind the instrument. The scale of the compass is now brought as near as possible



FIG. 4. Method of holding the instrument in measuring the height of the head.

over the bregma, the spread of the branches of the compass is noted on the scale, the distance from bregma to lowest part of the scale is carefully ascertained by the rod of the sliding compass, and the operation is completed. All that is now necessary is to read off on a previously prepared scale the total height from the base line of the points of the compass to the lowest part of the scale of the same at the spread observed in the subject at hand, and to deduct from this the distance between the bregma and the scale. Special care must be exercised that neither of the branches (particularly that in the right ear) slip out of the meatus. (Fig. 4).

This method is readily learned and causes the minimum of inconvenience to the subject (particularly if the points of the instrument are warmed in water or by the breath of the observer before introduction), and with due care it gives results which vary within less than 3 mm. The time required is scarcely more than the average time for ascertaining the head length. The external portions of the floor of the meatus, while not as perfect landmarks as could be desired, give with this method and instrument, in the writer's experience, results that are more satisfactory than those obtained by any other method or instrument so far devised for taking this important measurement of the head. The preference of bregma to the vertex for the superior 'point de repère,' is in accordance with the Geneva Agreement, which stipulates two heights of the vault and both to the bregma.

Measurements of the Face.—The face in the living can hardly be considered without including the forehead, which contributes in an important way to the physiognomy. In consequence certain measurements of the "face" include the frontal part of the head up to the line of the hair.

The essential measurements on the face are its anatomic and physiognomic heights, and its greatest breadth; but generally it is also advisable to include the smallest frontal and the bigonal diameter.

Instrument: The spreading compass (Broca or Hrdlička).

Preliminaries: The location of the *nasion*, and the middle point of the hair line (*crinion*), may with advantage be marked beforehand by aniline pencil.

The *nasion* should correspond as closely as possible to the anatomical nasion, *i.e.*, the mid point of the naso-frontal suture. In a certain proportion of subjects this point may be felt by the observer's finger nail or the point of a pencil; but in the majority we must rely on knowledge of its location derived from extensive observation on skulls and dissecting room material. It is always situated above a horizontal line connecting the two inner canthi.

The *crinion* is the mid point of the hair line, where this forms a regular arc. Occasionally a more or less marked V-shape extension of the hair downward in the median line will mar this arc, in which case it will be requisite to extend the lateral parts of the arc until they connect and mark the crinion in the middle of this line. But little difficulty will be experienced in this connection.

Face Length, Anatomical.—The distance from the menton (the lowest point in the middle of the bony chin), to the nasion.

Method: Hold large spreading compass so that the points repose on the balls of the two forefingers. Ascertain with the projecting part of the left forefinger the lowest part of the chin, apply to it the point of the compass, and hold in position by the forefinger. Open the instrument sufficiently, apply little finger of the right hand to the head of the subject for support, bring the right forefinger with the end of the right branch to the forehead a short distance above the nasion, and without moving the skin up or down apply the point of the instrument carefully to the nasion, at the same time reading the scale.

Height to Crinion.—Method: Without removing the hands or instrument after the measurement to nasion has been secured, the upper branch of the compass is elevated until it touches the crinion, and the measurement is read off.

The manipulation is simple and the values of the two measurements are easily carried in mind until they can be recorded.

Face Breadth.—The maximum bizygomatic diameter.

Landmarks: The most widely separated points on the external surface of the zygomatic arches (Intern. Agr.).

Method: Hold instrument as in measuring facial heights. Bring over zygomatic arches, feel with forefingers their maximum convexity, apply points of instrument with sufficient pressure to feel resistance of the bone, and pass forward and backward in up and down zigzags, watching the scale; repeat process in opposite direction, and perhaps once more forward and backward, until the maximum breadth is ascertained.

Diameter Frontal Minimum.—The minimum frontal breadth, or the shortest horizontal diameter between the two temporal crests on the frontal bone.

Instrument: Compas d'épaisseur, Broca or Hrdlička.

Method: Hold instrument as for measuring the facial heights and breadth. Search with forefingers above the lateral angular processes of the frontal for the deepest part in the curve of each temporal line; when found slip the points of the forefingers behind the lines, apply points of compass to the same, and read measurement.

Diameter Bigonial.—Instrument: Compas d'épaisseur, Broca or Hrdlička.

Landmarks: The gonions or points of the angles of the lower jaw. The separation of the angles is measured by applying the compass to the most prominent points on their external surface.

Method: Hold instrument in same way as for the other facial

measurements; ascertain most prominent points of angles with tips of forefingers, slip these a little behind, apply points of compass to the points just ascertained and read off the measurement.

Height of Forehead.—The height of the forehead is the difference between the menton-nasion and the menton-crinion diameters.

MEASUREMENTS OF THE NOSE, MOUTH, AND EARS

Nose: Length.—The length (or "height") of the nose from the nasal septum where this joins the upper lip, to the nasion (Intern. Agr.).

Instrument: The sliding compass.

Method: Apply left hand over the head of the subject in such a way that the thumb is a short distance above the nasion. Place the fixed branch of the compass against the thumb, and with this bring gently to touch the nasion. Push movable branch of compass to point where the line of the septum joins the skin descending from the nose to the upper lip, remove instrument and read measurement.

In cases where no point of demarkation between the upper lip and nasal septum exists it will be necessary to press slightly on the lower branch of the instrument in the line of the septum, until the requisite point is reached. The student bears in mind that his object is to ascertain the correct length of the nose alone.

Breadth.—The maximum normal external breadth of the nasal alæ, determined without the exertion of any pressure.

Instrument: The sliding compass.

Method: Hold instrument in right hand, with thumb on the sliding branch and points upward. Place dorsal parts of the third and fourth fingers of the left hand on the subject's chin, with the forefinger free; apply distal branch of compass to your forefinger, and with this acting as a support bring to the most prominent part of the right nostril; push sliding branch gently to most prominent part of left nostril, turn instrument slightly forward and backward to ascertain that both branches are touching and not compressing the skin, remove and read measurement.

Remarks.—The position of the left hand of the observer in connection with both measurements on the nose is of considerable importance and assistance, assuring a safe, quick and accurate measurement, and giving the subject a sense of confidence. In measuring the breadth of the nose, care must be taken that the nostrils of the subject are not

dilated; a more or less unconscious dilatation will take place in some subjects when the measurement is to be taken.

Mouth.—Breadth: The distance between the angles of the mouth at points where the mucous membrane joins the skin, with mouth naturally closed, without tension.

Instrument: Sliding compass.

Method: Apply forefinger of left hand to the chin and the medius below the chin. Place fixed branch of instrument on forefinger, apply to right corner of the mouth, bring point of sliding branch to left corner (without exactly touching either), remove instrument and read measurement.

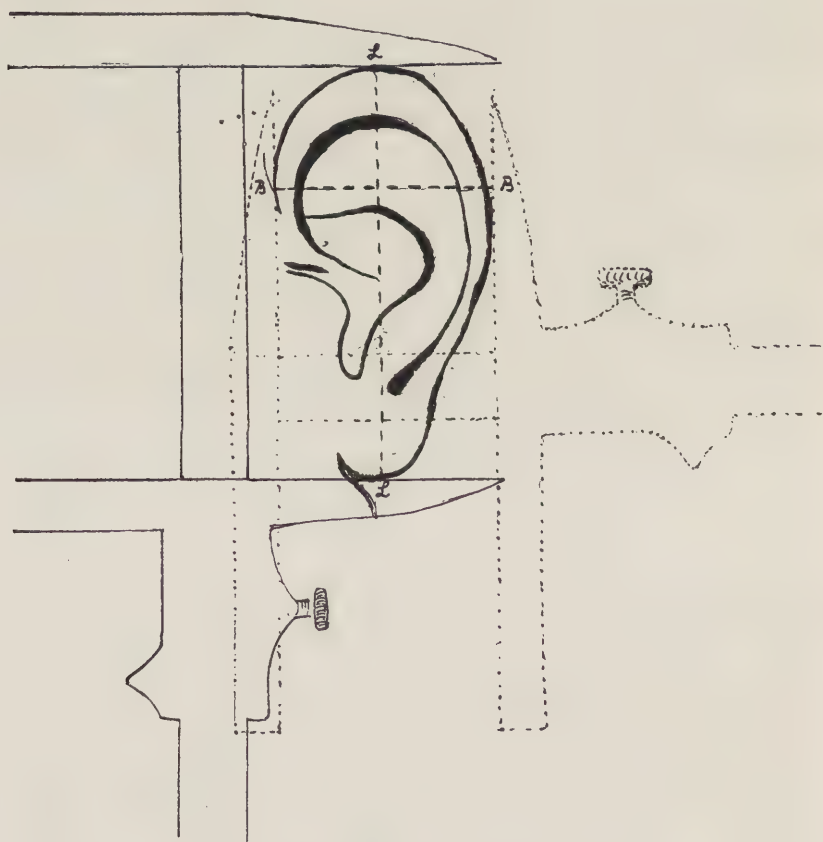


FIG. 5. Length and breadth of ear.

Left Ear.—The left ear for a right handed observer is much easier

to be measured and should therefore be the ear measured on all occasions. The two measurements to be taken are the greatest length, and the greatest breadth at right angles to the length. Both are taken with the sliding compass (Fig. 1).

Length Maximum.—Landmarks: Superiorly the highest point on the border of the helix; inferiorly the lowest point on the lobule. The rod of the compass should be held parallel to the long axis of the ear; use no pressure (Intern. Agr.).

Method: Place third, fourth and fifth fingers of left hand above the ear, apply fixed branch of compass to ball of the medius, bring it gently with this to the uppermost part of the ear, push sliding branch to lowermost point of lobule, holding instrument parallel to the long axis of the ear, and read measurement.

Breadth.—Distance between two lines parallel to the long axis of the ear, one of these lines being tangent to the anterior, the other to the posterior border of the helix (Intern. Agr.).

Method: Place three fingers of left hand above the ear as for preceding measurement. Apply fixed branch to ball of the free thumb, and with this bring to the anterior limit of the cartilage of the helix, which can be done most readily by applying a little pressure on the point of your instrument so that this sinks in front of the helix. Hold the fixed branch parallel to the long axis of the ear, bring sliding branch to the outermost part of the ear, and read measurement.

MEASUREMENTS OF THE TRUNK AND LIMBS

Breadth of Shoulders.—The most satisfactory breadth is that between the great tuberosities of the humeri, which are easily ascertained in all subjects.

Instrument: Large sliding compass (Topinard, Martin, or Hrdlička).

Method: Apply branches of compass to points indicated with sufficient pressure to feel the unyielding resistance of the bone, and read measurement. The arms in natural pendent position.

Diameters of the Chest.—The most satisfactory level for measuring the diameters of the chest is that at the height of the nipples in men, and at the corresponding height of the upper border of the fourth chondrosternal articulation in women. The developmental and racial variations at this point appear to be better marked than they are in any other part of the thorax.

Instrument: The large sliding compass (Topinard, or Hrdlička).

Method: Transverse diameter: Subject stands in natural, easy, erect position. The forearms are flexed at about right angles, and the arms are lifted forward and upward to about 30 degrees from the body. They are directed to be held limp without any tension, and the examiner satisfies himself that there is no tension by lightly taking hold of the forearms and moving the arms slightly up and down. The object of the position is on one hand to relax all the thoracic muscles, and on the other to permit the application of the instrument. The same position in every respect is preserved for the antero-posterior diameter.

The large compass is now applied to the chest in such a way that its rod lies directly over the nipples (or corresponding line in women), the fixed branch is pressed against the thorax until it meets with the resistance of the ribs, and the right branch is applied repeatedly to the opposite side of the thorax, with equal pressure, during inspiration and expiration, until the medium between the two can be arrived at. It is the medium which is recorded. The instrument is held so that its plane is at right angles to the vertical plane or axis of the thorax.

The *antero-posterior diameter* is taken so that the fixed branch of the compass is applied to the nipple line, the rod of the instrument to the ribs on the left side, and the movable branch to the posterior part of the thorax, the instrument being held again at right angles to the vertical axis of the chest. Here also we take repeated measurements until the medium between normal inspiration and expiration is ascertained, and this is recorded.

Measurements of the Limbs.—It is advisable to measure the left hand, left foot, and left leg, partly because of greater convenience, partly because in a large majority of persons the left limbs are less affected by work, and possibly also, at least in the case of the hand, by injuries.

Left Hand. Length.—The International Agreements have nothing on the measurements of the hand or foot; but measurements of both are indicated in Topinard's *Eléments*, etc., 1134–35, as well as in Martin. Those practiced by the author may be defined as follows:

The length of the hand in the living extends from the middle of the line connecting the proximal limits of the thenar and hypothenar eminences, to the end of the medius, with the hand in full extension.

Instrument: Sliding compass.

Method: Take a sheet of blotting paper, apply to points just given (which if indistinct can easily be ascertained by flexing the hand upon

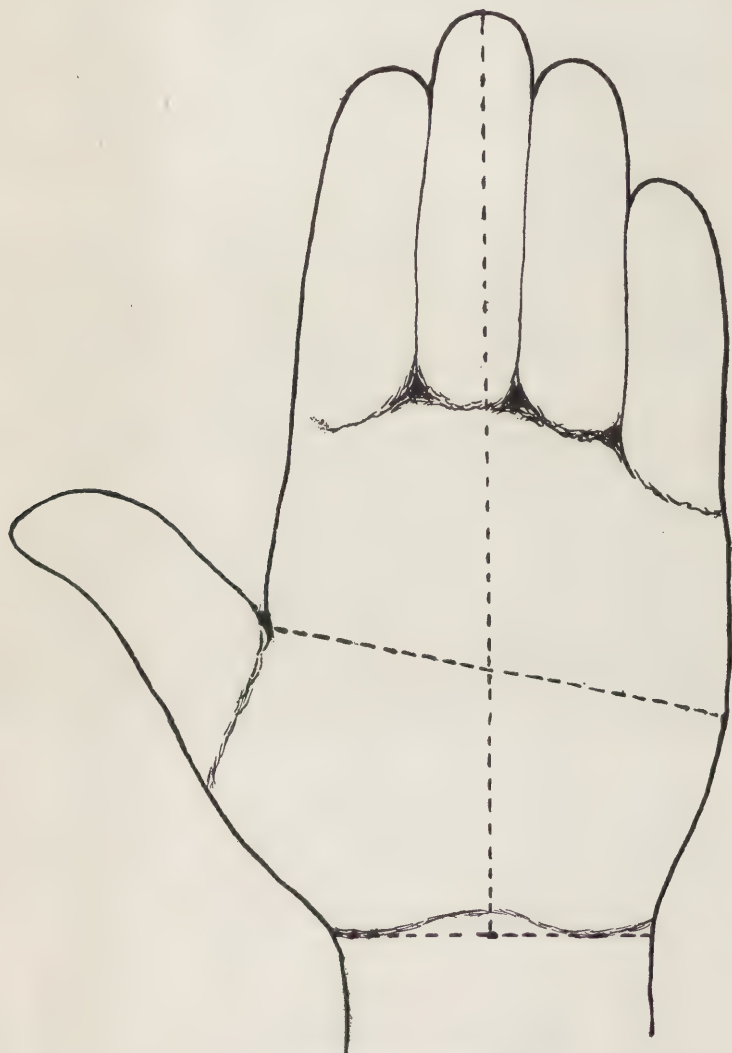


FIG. 6. Length and breadth of hand.

the forearm), mark mid-point with aniline pencil, and secure measurement with hand in full extension.

The easiest way to take the measurement is by placing observer's left hand under that of the subject with thumb close to the point from which the measurement is to be taken; applying the fixed branch of the compass to the observer's thumb and with this to the marked point at the wrist; seeing to it that the hand is fully extended, and bringing movable branch into light contact with the point of the medius. The rod of the compass is held parallel to the wrist-point—medius line.

Breadth.—The most expressive breadth of the hand is that across the palm, at nearly right angles to the length.

Instrument: The sliding compass.

Method: With hand in full extension, apply fixed branch of compass to the angle formed by the thumb and the radial side of the palm, and if necessary compress skin lightly until the point on which the instrument rests is in straight line with the radial surface of the forefinger and palm. The rod of the compass lies applied across the palm, and the moving branch is brought to a point on the ulnar side of the palm midway between the basal (metacarpo-phalangeal) groove of the little finger and the line limiting the hypothenar eminence.

The most satisfactory way of taking this measurement is for the observer to place his left hand under that of the subject so that the tip of his medius is just below the junction of the thumb and palm, and his thumb is on the palm itself. The point of the movable branch of the compass is now applied to the ball of the observer's medius, is brought with this to the required position in the palm-thumb angle of the subject's hand, and the fixed branch is brought slowly to the requisite point of the ulnar side of the palm. This latter point may be marked beforehand, but its location can be easily estimated. The breadth thus obtained is nearer the maximum, more logical, and easier to take, than would be that at strictly right angles to the length and is much more characteristic than the breadth across the metacarpo-phalangeal articulations.

Left Foot. Length.—Length maximum, parallel with the long axis of the foot.

Instrument: The large sliding compass.

Method: The easiest way to secure this measurement accurately is to direct the subject to place his left foot upon the bench (usually that which has been used for determining the height sitting), without pressure, putting all his weight on the right limb. The large sliding compass is then applied so that its rod lies parallel with the long axis of the foot, its fixed branch touches the heel, and its movable branch is brought lightly to the most distal part of the longest toe.

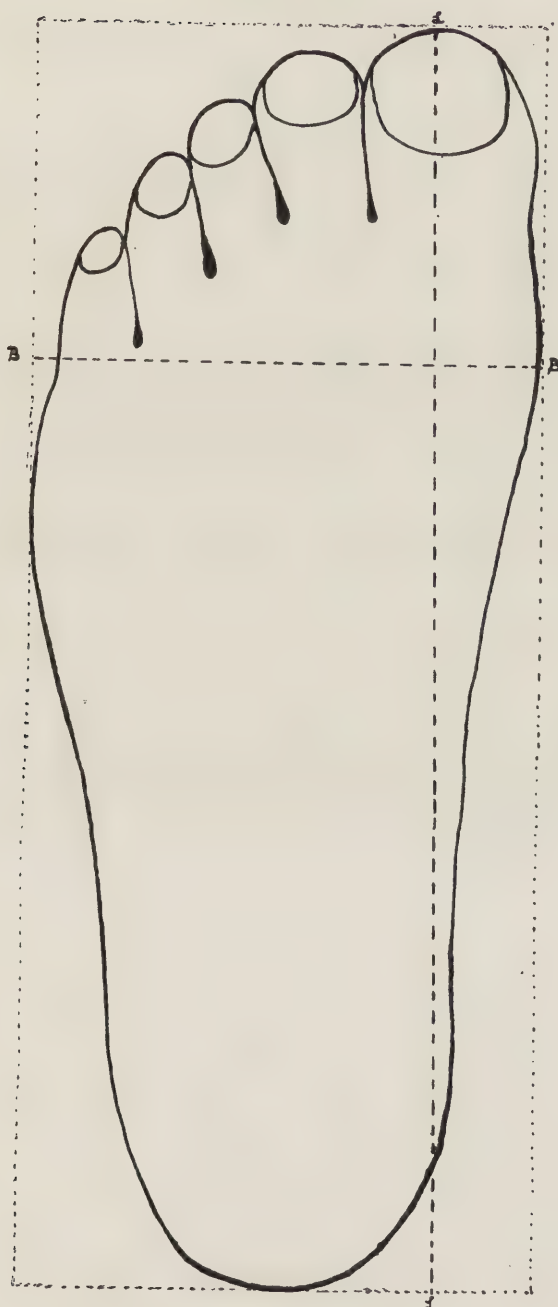


FIG. 7. Length and breadth of foot.

Breadth: The maximum breadth of the foot, at right angles to the length.

Instrument: The large sliding compass.

Method: Apply fixed branch of instrument to inner side of foot parallel with its long axis, and bring movable branch lightly against most prominent part on the outer side of the foot.

Girth of Calf.—Maximum circumference of calf. Measurement useful racially, and also in general for comparison of musculature.

Instrument: Anthropometric tape.

Method: The left foot is placed on a bench, as for measurements of the foot itself, and it is brought forward so that the leg forms a little larger than a right angle with the thigh, to insure relaxation of all muscles. The tape, held between the thumb and fore-finger of each hand, is then applied somewhat above what appears to be the maximum bulge of the leg, and is brought snugly around the leg but not tightly enough to cause an impression, and a mental note is made of the measurement. The tape is then moved, with a side to side motion, slightly lower and the measurement is observed again; and the process is repeated until the maximum girth has been determined.

OBSERVATIONS ON THE LIVING

As in the case of measurements so in that of visual observations there is possible a great range of detail, which on special occasions and in studies of single organs may be fully justifiable and even necessary, but which has no place in work of more general, routine nature. Thus in the case of the nose there is a possibility of making interesting detailed notes on the height and nature of the septum, on the characters of the point, on the shape of the nostrils, on the stoutness and other characteristics of the root; in the case of the eyes, on the detailed characteristics of each lid and canthus, with almost endless details on the coloration. All this, however, is impossible under the usual stress of work both in field and in the laboratory. Here again, as in the case of the measurements, we must subordinate whatever is not essential to the number of subjects, and the possibility of prompt elaboration of data. But there are certain minima which the observer ought not to pass if his work is to be fairly rounded out, and it is on these that attention will here be concentrated.¹

¹ For greater minutiae the student may be referred especially to the outlines of the anthropometric work on Austria's prisoners carried on during the war by Rudolf Pösch, published in 1915-17 in the *Mitt. Anthropol. Ges.*, Wien.

Important features in this connection are the order of procedure, and especially the mode of recording. The procedure should be as far as possible logical, the eye passing from organ to organ in the most natural order; and the recording is best done in definite, steadily adhered to abbreviations, which are recorded like measurements in columns and can eventually be summed up and analyzed in much the same manner.

Another important subject is the characterizing of certain observations, such as for instance the thickness of the lips, size of the eye aperture, quantity of beard, etc. To properly describe such variations we are in absolute need of definite, well-known standards or media, and the most available and intelligible standards to us of the white race are those of our own, the white people. To become properly acquainted with these "means" must therefore self-evidently be one of the first aims of the worker in physical anthropology.

All observations should be made in good and as far as possible even (northern) light, never in dusk or in direct sunlight, and at the most effective visual distances for the student. And of course, where possible, he will use well-known artificial standards.

The following classification of characteristics agrees in essentials with that of anthropologists in general, differing only in a few details, as indicated by prolonged experience on varied races. For the sake of brevity it is given in a somewhat schematic form, which will need but little explanation.

As to abbreviations, the student is free to adopt such as will best suit him. The author has thus always used the easily made and read sign of + for "medium," "average," "normal," for which we have no other symbol. Terms often called for, such as "slight" (sl.), or "slightly" (sl.), "some" (sm.) or "somewhat" (sm.), "moderate" (mod.) or "submedium" (subm.), "considerable" (cons.), "marked" (mk.), or "pronounced" (pron.), and "excessive" (exc.), are easily understood by all and easy to record.

COLOR OF SKIN

Remarks: Observations best taken on chest, back, or upper portion of arms. Color standards useful on dark races, but of very limited utility with whites. Student should bear in mind that pathological conditions, particularly those which affect the blood, may alter for the time being the color of the skin, even in very dark individuals; and also that even dark skins may be perceptibly changed by sunburn or long exposure to the sun.

DESCRIPTIVE TERMS

*Class of Color.**Shades.*

WHITE—florid—light—medium—brunet—dusky—light brown.

YELLOW—pale yellowish or sallow—tawny (brownish yellow)—dusky yellow.

BROWN—light—medium—dark—chocolate (solid).

BLACK—brown black—bluish black—greyish black—ebony black.

EYES

What is generally observed about the eyes is the direction of the palpebral fissure or eye-slit, and the color of the iris. Any other feature found to characterize an anthropological group should of course be noted. The color of the conjunctiva is more of age than racial significance.

COLOR OF EYES

Remarks: Good soft light and close attention are necessary. In Whites, and particularly Americans, a large majority of eyes are mixtures, or blends, of the blues and browns, and both parental colors may be represented, the brown aggregated about the pupil, in lake or spots; the mostly more or less modified blue outside. In rare cases the brown may be present in the form of a wedge-shaped segment; and the two eyes may be of a different shade. Eyes change in color from infancy to childhood and again during senility; and in mixed populations the change may even be from brownish to grey or bluish or *vice versa*. Mixed shades may also change perceptibly with physical condition and mental state of subject. In recording, the student may either restrict himself to noting the prevailing color (*i.e.*, that of the more distal zones of the iris), or record both this as well as the presence of the brown color or spots about the pupil.

EYESLITS

Direction: horizontal;

oblique	{	ext. canthi higher	{	slightly;
		ext. canthi lower		moderately;
				markedly.

mongolic fold.

EYE COLORS

Classes

Blue—light ("forget-me-nots"), medium, rich blue, slate blue.

Subclasses

Green—often merely “greenish”; commonly associated with some brown; frequent in United States.

Gray—common among northern Slavs.

Brown—light, medium, dark, very dark.

Black—really extreme of brown, appearing black, in Negroes.

Conjunctiva—bluish, pearly white, yellowish, dirty or reddish yellow.

HAIR

In quantity, the hair may be “normal” or “medium,” “thick” (term in vogue among men) or “rich” (term in vogue among women and applying to length as well as profusion).

In character, it may be naturally “straight,” “wavy” (slightly or markedly), “curly” (slightly, markedly), “frizzly,” “wooly,” or “peppercorn” (en rouleux).

HAIR-COLOR

Remarks: Among Whites hair color, like eye color, changes with growth, as a rule darkening from infancy onward; it also varies perceptibly according to the state of blood and in certain pronounced mental conditions of the subject, and may present parts (particularly postero-inferiorly), strands, or tufts of more or less different shade. The color recorded is the prevailing one, with special note, if advisable, on variations. In gray-haired subjects record original color, as far as ascertainable, as well as degree of greyiness (“few gray hairs,” “some,” “abt. $\frac{1}{8}$, $\frac{1}{3}$, $\frac{1}{2}$, most, nearly all, all gray”). In dark races grayness rarely reaches pure whiteness and the hair may be yellowish. A special shade that may be difficult to classify should be described in observer’s own words. Hair color may also be affected by exposure to sun, washing with alkalies, or by staining; what will be recorded will, of course, be the natural color.

HAIR-COLORS

Classes.

Blonds—Pigmentless, flaxen, straw, dull yellow, golden yellow.

Intermediaries—Light brown, ashy, medium brown, medium reddish-brown.

Brunets—Dark brown, near black.

Blacks—Rusty-black, bluish-black, coke-black, black.

NASAL BRIDGE

Character: Straight

Concave	{	slightly
		moderately
		markedly
Convex	{	slightly
		moderately
		markedly
Concavo-convex		

NASAL SEPTUM

Inclination: Horizontal

Directed upward	{	slightly
		moderately
		markedly
Directed downward	{	slightly
		moderately
		markedly

MALARS

Prominence: none—slight—medium—above medium—pronounced.

ALVEOLAR PROGNATHISM

Grade: none—small—medium—above medium—pronounced.

LIPS

Thickness: thin—medium—above medium—thick.

CHIN

Prominence: submedium—medium—pronounced.

Form: ordinary—square—pointed.

Note: What is commonly called receding chin is generally so only in appearance.

ANGLES OF LOWER JAW

Prominence: submedium—medium—prominent.

NECK

Size: thin—medium—thick.

Length: short—medium—long.

BODY AND LIMBS

General state: thin—lank—medium—very muscular—plump—obese.
Asymmetries:

EARS

Marked peculiarities:

FINGERS AND TOES

Length: short—medium—long.
Position: normal—standing apart—crowding.
Peculiarities and Anomalies:

BREASTS

(in women who have had no children)

Shape: conical—intermediate—hemispherical.
Size: small—medium—large.

PHYSIOLOGICAL OBSERVATIONS

Pulse: Subject sitting, at rest, and not soon after a meal or during fasting, after a long walk or other strenuous exercise, after or under excitement. A good method is for the observer to count by quarters of a minute, repeating until right count is ascertained.

Respiration: Same general rules as for pulse. Count immediately after taking pulse and without attracting subject's attention (important). Count by minutes.

Temperature: Same general rules as for pulse. Taken invariably under the tongue, the thermometer being introduced before we begin to take our visual observations and count the pulse. This gives plenty of time for a correct record with even a slow thermometer.

Remarks: In connection with pulse, respiration and temperature, record time of day, and also invariably the condition of the tongue. A coated tongue often tells of temporary or chronic derangement which modifies the temperature, pulse, and perhaps even respiration. No records of subjects with coated tongue should be included in the eventual analysis with the "normal" series.

HAND PRESSURE

Dynamometric observations may well be restricted to pressure with each hand, leaving out traction, lifting strength, etc. The object

of the observer is to secure the maximum effort in each hand and he must stimulate the subject to a maximum exertion. As a rule at least two tests are to be made with each hand, after which fatigue ensues.

Combined with these tests may be made an inquiry into right- and left-handedness, but this is not as simple as may be thought at first and will require some special preparation.¹

MISCELLANEOUS

Other physiological observations, such as those on blood-pressure, lung capacity, acuity of perception and response, etc., may be added to the above, but are scarcely fit for a general routine examination.

TEETH

The examination as to the condition of the teeth fits best perhaps at this place. We examine for state of eruption; for abnormalities (crowding, impaction, etc.), and anomalies (persistent teeth of first dentition, congenital absence, supernumeraries, etc.); also for decay.

Combined with examination of the teeth may be that of the palate, but it is preferable to make a special study of that structure.

WEIGHT

Except in recruiting and army camps, we are obliged, or find it advisable, to weigh our subjects with a certain amount of clothing, the weight of which may readily be approximated and eventually subtracted. The author finds it most convenient to weigh his subjects in their ordinary clothing and shoes, but without coats, wraps or hat.

¹ See No. 4 of this JOURNAL.



LITERATURE

VARIATION: SKELETAL

SCAPULA SCAPHOIDEA. By Nonne (—)—*Deutsch. med. Wochenschr.*, 1918, XLIII, No. 5, 159.

The "scaphoid" scapula as an assumed "sign of degeneration" has reached Germany. The author found it in a 14-year old boy of a syphilitic mother, and following Graves, Kellner, Clemens, Kollert, E. Reye, and Dräske regards the shape as a sign of degeneration, attributable to pathological heritage. How such a heritage comes to affect the otherwise quite immune scapula in such a remarkable and uniform way, he does not attempt to explain. "The scaphoid" shape of the shoulder blade has been formerly connected, equally without a satisfactory explanation, with the heritage of tuberculosis, alcoholism, psychopathic conditions, as well as lues. It is strange that so far one of then supporters of these hypotheses have taken the trouble to examine some of the larger anthropological collections where hundreds and collectively thousands of scapulae of different races and ages can be studied, and the significance of the scaphoid type—one of three distinct and recurring types of the bone—may be determined. The facts are that the "scaphoid" form of the shoulder blade, or one marked by a more or less marked concavity of a part or the whole of the vertebral border of the bone, occurs in all races and at all times; that it also occurs in the higher anthropoid apes, particularly the chimpanzee; and that is it found occasionally even in some lower monkeys, such as for instance *Nasalis larvatus*. It is plainly a morphological variant, connected possibly with definite variations in the scapular muscles. There is not a large bone in the body that does not show from two to several distinct forms (compare Hrdlička, A.—Typical forms of shaft of long bones. *Proc. Ass. Am. Anat.*, 14th Sess., 1900, Wash., 1901, 55–60). But all this is quite unexciting and if shown in a simple anatomical way would mean cutting short of the existence of another easily ridden hobby-horse, which would be a pity. Graves, by the way, is not responsible for all his followers would make out of the character in question. He is at this very moment engaged in a serious restudy of the whole question.

SOME INDICES AND MEASUREMENTS OF THE MODERN FEMUR. By Holtby (J. R. D.)—*J. Anat.*, 1918, LII, pp. 263–382.

A report on measurements of 100 femora "taken from the bones ordinarily in use for teaching purposes in the Anatomical Department of Trinity College, Dublin." Fifty-six of these bones were identified (on the dry material) as those of males, 44 as those of females. The

results on this rather imperfect and inadequate series show that: (1) The average length of the bones in each group resemble those in Parson's Rothwell series so closely, that we may assume there has been little or no change in stature since the Middle Ages. It would be interesting to know if the remarkable differences between the right and left sides in males is borne out by a fairly large series of known pairs. (2) The sex distribution as regards diameter of head seems to vary within somewhat narrower limits than Parsons and Dwight thought, viz., bones with a measurement of less than 44 mm. are usually females, those over .46 are usually males. (3) Short bones have relatively larger extremities than long ones. (4) There is more variation in the diameter of the head than of the bicondylar width on the two sides. (5) Left femora have somewhat broader shafts than their fellows. (6) Pilastring is fairly common nowadays, and may be said to be distinct if the index be over 114 on the left side and 116 on the right. The latter are not only more pilastered in the average, but also show a larger percentage of distinctly pilastered bones than does the left side. (7) There is a sexual influence in the degree of platymery, but no difference between the two limbs. (8) The degree of platymery bears no definite relationship to that of pilastering, so the two are probably not due to the same cause. (9) Generally speaking, short bones are more bowed than long ones. (10) There is no definite inter-relationship between bowing, platymery, and pilastering. These generalizations may be premature.

MISSBILDUNG BEI NEUGEBORENEN. By Feyerabend (Frl.)—*Berl. klin. Wochenschr.*, 1917, LIV, 294.

The author reports the case of a child, otherwise normal and born from a strong, healthy mother, with very considerably checked and anomalous development of all the bones of the upper extremities, and particularly those of the forearms and hands. Causation uncertain.

ANGEBORENER LINKSSEITIGER ULNADEFEKT. By Maas (O.)—*Berl. klin. Wochenschr.*, 1917, LIV, 234-236.

The defect was found in a recruit 23 years of age. Nothing similar known in the family. Gestation in the case was normal, delivery easy, no accident. Consequences of the anomaly began to show first during the third year. The left upper limb is somewhat shorter than the right (by 6 cm.); the left forearm shows a curvature; the left hand is slightly more slender and smaller than the right. Circumference maximum of the arm: right, 26, left, 22.7 cm. Active and passive movements of the left upper extremity about normal; strength in left hand approximately half of that in the right. Face shows appreciably better development on the right than on the left side; on rest of body with minor exceptions nothing abnormal. Mentality subaverage. X-ray examination shows that on the left side only the proximate third of the ulna is present, tapering downward. The radius presents abnormal curvature and a complete external disloca-

tion. As to etiology of the anomaly in this case, the author is inclined towards endogenous congenital, rather than intra-uterine mechanical, causes.

RUDIMENTÄRE HALSRIPPEN BEIDERSEITS UND OTOSKLEROSE. By Krisch (H.).—*Deutsch med. Wochenschr.*, 1918, XLIV, No. 24, 670.

X-ray examination of a young man of 20 who suffered from increasing deafness and symptoms of nervous derangement in the right arm, showed two rudimentary cervical ribs, about 3 cm. in length (right slightly longer than left), connected with the transverse processes of the seventh cervical vertebra.

MISSBILDUNG AN DER HALSWIRBELSÄULE UND AM SCHÄDEL EINES NEUGEBORENEN. By Weibel (W.).—*Wien. klin. Wochenschr.*, 1918, XXXI, 27.

A female child born in one of the obstetric wards of the City Hospital, Vienna, shows externally a neck so short that the shoulders touch and raise the ear lobules. The head is easily movable, but is held slightly inclined towards the left side. An X-ray shows only five cervical vertebrae, and these not normally developed. The cervical spine as a whole presents a lordosis. The neural arches of the two uppermost vertebrae are possibly posteriorly incomplete (*Spina bifida cervicalis occulta?*). The occipital showed at first unusual softness, due to retardation in ossification, but this was gradually diminishing.

MORPHOLOGISCHE UNTERSUCHUNGEN AN ZÄHNEN VON ALAMANNEN AUS DEM V BIS X JAHRHUNDERT. By Schwerz (F.).—*Archiv f. Anthropol.*, 1916, xv, H. 1, 1-43.

During the last few years the Landesmuseum in Zurich acquired from the old cemetery at Augst (Canton Aargau) a large number of skeletal remains of the Alamanni, a Germanic tribe. This material offers among others favorable opportunities for the study of the teeth, and this was carried out in an exemplary way by the author. The remains date from the fifth to the tenth century, A.D. The number of teeth it was possible to study amounted to no less than 7,000; and the report deals in detail with their form, size, numbers, characteristics and anomalies, and with their disease. Among the numerous interesting results may be mentioned the decidedly larger dimensions of the median than lateral upper incisors; a rarity (only two instances) of supernumerary teeth in the region of the upper incisors; relatively large canines and molars; a relative rarity of the lingual (Carabell's) tubercle on the molars; absence of diastemae in the upper dental arch; and other conditions. In 5.7 per cent of the lower canines the root was more or less double. The teeth lost in life or showing caries amounted to 14.5 per cent for the upper, and 14.4 per cent for the lower jaws. The most frequently affected were the lower first and the upper second molars, the most seldom diseased being the lateral incisors and the canines.

VARIATION; SOFT PARTS, LIMBS

[PHYSIOGNOMY.] MUSCLES OF THE FACE—MICROSCOPIC EXAMINATION OF THEIR ORIGIN AND INSERTION IN THE SKIN. By Adachi (S.)—*Kyoto J. Med. Sc.* (in Jap.), 1918, xv, 123-33.

The author has reached the very simple conclusion that there are great individual differences in the insertion of the facial muscles, and that upon this fact is to be explained much of the individuality of facial expression. Serial sections were cut including the skin and subcutaneous tissue, in line with the muscle and the periosteum to which it was attached. (*Jap. Med. Lit.*, publ. by Res. Staff of Severance Union Med. Coll., *The China Med. J.*, 1919, iv, No. 2, 21.)

A HITHERTO UNDESCRIBED MALFORMATION OF THE HEART. By Blakeway (H.)—*J. Anat.*, 1918, lxi, Pt. 4, 354-362.

The specimen in question comes from a male English infant. The child, which weighed seven pounds, survived only thirty-eight hours. The heart shows a condition which, so far as known to the author, has not up to the present been described. The aorta, "though of normal size, has no communication with either ventricle, but was filled from near the apex of the left ventricle by way of the anterior interventricular branch of the left coronary artery." There are also other abnormalities.

DOUBLE URETERS IN HUMAN AND PIG EMBRYOS. By Pohlman (A. G.)—*Anat. Rec.*, xv, No. 7, 1919, 369-373.

"The double ureter has a certain developmental importance in that it furnishes a clew for the disappearance of the cloacal segment of the Wolffian duct, and its manner of incorporation into the bladder. Two cases of complete double ureter were reported in 1905; one in the Mall embryo, no. 175 (13 mm.) and the other in the Keibel embryo, Piper (24 mm.). Both of these embryos show that the ureter from the lower part of the kidney lies dorsad to the ureter from the upper pole, and as they swing around to occupy a lateral position on the Wolffian duct, the dorsal or lower ureter is displaced lateralward, while the ventral or upper ureter lies between it and the Wolffian duct."

The author gives drawings illustrating the anomaly in both of these specimens, and refers to former reports of similar anomalies in man. In addition he speaks briefly of the condition as found by him in three pigs.

EINE MISSBILDUNG IN VIER GENERATIONEN. By Kathe (—)—*Med. klin., Berl.*, 1918, xiv, 642.

The inspection of the unprecedented array of recruits has brought to the attention of the examiners numerous anomalies, one of which, recurring in the family in four generations, is here reported. A 20-year-old man attracted attention through an unusual plumpness as well as flatness of his feet and especially through large and mal-

formed great toes. The same subject shows a light mongolism, but otherwise appears about normal. Of the great toes, the right is in a sort of a supination, the left in pronation; the nail of the right toe is lightly furrowed along the middle, that of the left completely divided. The conditions were reported as congenital. An X-ray photo demonstrates the first metatarsal on both sides to be double, and the same applies also of the phalanges of the great toe of the left, while on the right the condition is more rudimentary. According to information by the subject, the anomaly occurred first in one of the brothers of his paternal grandfather. Among the twelve children of this man (eight boys and four girls) the subject's father was the only one with a similar anomaly. In the families of the remaining eleven children the anomaly appeared in but one boy (son of one of the subject's paternal aunts). Of the subject's brothers and sisters, one brother and one sister are married. In the family of the brother there is one male child, which shows a similar abnormality of toes; the sister has two children, a boy and a girl, both normal. The anomaly is thus evidently limited to males, though transmissible through both sexes, and it does not appear to obey the Mendelian law. An additional noteworthy fact is that in one of the paternal uncles of the subject there occurred a bilateral syndaktyly.

UEBER ARACHNODAKTYLIE (SPINNENFINGRIGKEIT). By Rietschel (?)—*Muench. med. Wochenschr.*, 1917, LXIV, No. 24, 781.

The term arachnodaktyly (Achard) is applied to a condition characterized by an abnormal slenderness and prolongation of the fingers and toes. So far as Germany is concerned the condition is known only since 1914 and the total number of cases so far reported including the present amounts to seven. The total number reported in medical literature at large is ten. The subjects range from seven months to eighteen years of age, the majority, however, of the so far reported cases being grouped between seven months and the seventh year. Of the ten cases, seven were in girls, three in boys. The metacarpals and metatarsals participate in the prolongation. In the case under consideration the length of the body and limbs shows nothing abnormal and the internal organs, together with the blood, present nothing special. There is, however, some "mongolism" and a few other anomalies. The cause of the condition, in the opinion of the author, is to be looked for in a congenital disturbance of the germ plasm, or "blastophthory." Heredity of the condition has not as yet been observed.

H. Faust, in discussion, recalls two analogous cases in women 50 years of age. Both had abnormally long and narrow feet as well as hands, with long toes and fingers. One of them has normal children, the other has a daughter with a congenital myxedema.

SYMMETRISCHE SYNDAKTYLIE BEIDER HÄNDE UND FÜSSE. By Roskoschny (F.)—*Deutsch. Med. Wochenschr.*, March 28, 1918, XLIV, 350-51.

An infantryman, of lower Styria (Austria), presented a whole-length dermal union of the otherwise well developed middle and fourth fingers on each hand; and partial proximal union [which is quite common] of the second and third toes on each foot. The phalanges in each case are normally developed and completely free. Both the father and the grandfather of the subject had joined fingers, but the rest of the immediate family, mother, sister and two brothers, have normal hands. The author attributes the anomaly to checked development.

UBER ECTRODACTYLIE. By Stieve (H.)—*Z. f. Morphol. & Anthropol.*, 1916, xx, H. 1, 73-110.

Ectrodactyly is a term designating cases of congenital want of one or more fingers or toes. Abnormalities of this nature generally accompany other malformations of the more proximal parts of the hands and feet, and particularly the so-called split hand ("Spalthand"), though in rare instances they may occur alone. Thus far reported cases relate mostly to the absence of the thumb or of the fourth or fifth finger, and the reports are restricted to brief descriptions. The author describes three new cases of these anomalies. In two of these the abnormality was limited to the left hand, in the third it affected both hands. The first was observed in a man 34 years of age and otherwise well developed, and consisted of a complete congenital absence on the left hand of the fourth and fifth fingers, with the corresponding metacarpals, and with defects in the carpus. The second case was in a 28-year-old volunteer artilleryman. The left hand showed a complete absence of the fifth finger and its metacarpal, with defects and abnormalities of the carpus, and also a subnormal medius. The third case was observed in an 11-year old boy whose parents and relatives are free from all anomalies of similar nature, was bi-lateral and consisted of the presence on the right hand of only two, on the left hand of only three fingers. An X-ray of the right hand showed a duplication of the terminal phalanx of the thumb. The metacarpal elements corresponding to the missing fingers are absent and the carpus bones on both sides are abnormal as well as reduced in number. In following discussion the author shows that these anomalies are not to be classed with the "Spalthand." He classes the defects he describes as marginal (ulnar) defects. So far as heredity of these cases is concerned nothing of such a nature could be found in the three subjects under consideration, from which it would seem that ectrodactyly is not hereditary. After a careful survey of the literature on related cases the author inclines to the opinion that only those malformations of the extremities are hereditary in which the anomaly occurs on both sides of the body, and that especially when it is symmetrical. The careful study is accompanied by good bibliography.

VARIATION: RACIAL

UNTERSUCHUNGEN AN SCHÄDELN AUS NIEDERLÄNDISCH-SÜD-WEST-NEU-GUINEA. By Broek (A. J. P. v. d.)—*Nova Guinea*, Leide, 1915, 40, VII, Part II, 163–232, Tables, 7 pl.

This is a good report on 116 "Papuan" crania, of which 90 adult, from the region of Alkmara Bivak, Noord- and Noordwest Rivers, Dutch New Guinea, gathered in the main by the Lorenz Expedition (1909–10).

The material shows considerably heterogeneity. The cephalic index ranges from 63.2 to 82.2 (75.5 per cent hyperdolicho- and dolichocephalic, 21 per cent mesocephalic, 3.4 per cent brachycephalic). The capacity, calculated by Welcker's formula, averages 1251 (1091–1476) cc. for skulls diagnosed as male, and 1154 (995–1434) c.c. for those classed as female. The facial parts are but moderately developed. Upper facial index is chamaeprosopic in 25 per cent, mesoprosopic in 58 per cent, leptoprosopic in 17 per cent of the subjects. The orbits are equally very variable. The nose is mainly platy- and mesorhinic. The total diversity points to a mixture of a heterogeneous brachy- and dolichocephalic type—possibly the Pygmies and the Papuas.

Aside of their rather unsatisfactory anthropological characteristics the skulls show numerous interesting individual features and anomalies, among which frequent squamo-frontal articulation and epipteric bones—conditions regarded by the author as homologous, and various features about the foramen magnum, which he sums under the term of "manifestations of an occipital vertebra." One child skull presents bilaterally a short anterior fissure which the author regards as a remnant of the interparietal suture. This part of the report is reprinted in the *Z. f. Morph. & Anthropol.*, 1917, xx, No. 2, 229–258 ("Ueber die Regio pterica am menschlichen Schädel auf Grund von Untersuchungen an Papua-Schädeln").

ZUR ANTHROPOLOGIE DES BERGSTAMMES PESECHEM IM INNERN VON NIEDERLÄNDISCH-NEU-GUINEA. By Broek (A. J. P. v. d.)—*Nova Guinea*, Leide, 1915, 40, VII, Part II, 233–276, Tables, 6 pl.

A discussion of the physical characteristics of the Pesechem hill tribe from Dutch New Guinea, a tribe that when discovered by the Lorenz Expedition (1909–10) "lived still completely in the stone age." The author's observations are based on measurements, data and photographs gathered by the expedition. The people in question present in general the characteristics of the present New Guinea highland tribes, differing from the coast Papua by a shorter stature, (aver. male 152.6 cm.), greater tendency to brachycephaly (aver. C. I. 80.7), and in other particulars. No definite conclusions as to the anthropological identity of the tribe are reached. The questions as to whether they together with the other hill tribes are to be regarded as related to the Negritos, or merely an environmental modifications of the Papua, cannot be answered without further and more extensive

studies on all these groups. The author evidently for the present does not incline to accept an identity with the negritos as fully established.

EYE-BALLS OF THE JAPANESE, ANATOMICAL INVESTIGATION OF. By Etsuchi (T.)—*J. Jap. Ophthalm. Soc.* (in Jap.), 1917, *xxi*, No. 9. 1263-87.

The growth in size during the first two years of life is very rapid and the eye-ball is comparable in size with that of the adult at eight years of age. The cornea is practically full size at two years. The further development is largely in the posterior portion of the ball behind the equator, while the change in the portion to which the rectus muscles are attached is mainly one of expansion of the arc beneath. Some of the average measurement of the eyes of babies at birth and of adults are here reproduced.

	New born baby	Adult
Equatorial circumference	55.0 mm.	77.51 mm.
Antero-posterior diameter	17.83	34.22
Vertical diameter	17.58	23.81
Horizontal diameter	16.6	23.79
Oblique, upper inner to lower outer	17.03	24.77
" upper outer to inner lower	17.02	24.3
Weight	2.8 gm.	7.43 gm.

Comparison of the growth of the cornea in the same conditions were;

Vertical diameter	9.98 mm.	11.52 mm.
Horizontal diameter	9.2	10.54

The expansion of the eye in circumference at different points:

Level of attachment of rectus muscles	53.4	69.48
Equatorial circumference	55.0	77.51

From Rev. Jap. Current Med. Lit., by staff of Res. Dep., Severance Union Med. Coll. Seoul, Korea, in *The China Med. J.*, 1919, *iv*, No. 1.

A SKETCH OF THE ANTHROPOLOGY OF ITALY. By Giuffrida-Ruggeri (V)—*J. R. Anthropol. Inst.*, *xlvi*, 1918, 80-102.

The paper includes anthropological data on the modern Italian population, and discussion as to the origin of the Italic peoples. It will be found useful as a general brief survey of the field, and also on account of the cited literature, much of which is not well known to English-speaking anthropologists. The article should be read in connection with that on "The Origin of the Italian People," published by the same author in the July-September number of the *AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY*.

L'INDICE TROCANTERICO E L'INDICE PUBICO. Nuovo contributo allo

studio delle proporzioni somatiche dei gruppi etnici. By Giuffrida-Ruggeri (V.)—*Riv. di Antropologia*, 1917-18, xxii.

The author calls the ratio $\frac{\text{trochanteric height} \times 100}{\text{stature}}$ the Trochanteric Index. If instead of the trochanteric height we take the sitting height, we get the skeletic index (erroneously called by Davenport the crural index; if instead we take the pubic height we get the pubic index. As the trochanteric height is taken from the great trochanter to the ground (and the same may be said of the pubic height) we have the opposite ratio to that obtained by the skeletic index, in which is used the vertico-ischiatic height. The author uses the data published by Ivanovsky in 1911 and confronts them with those obtained by him when using the skeletic index (about 300 series). It appears that only some of the tribes of South America are better known by the trochanteric than by the skeletic index. Other comparisons are made between the trochanteric index and the pubic index in the two sexes, from which it appears that the trochanterion is higher than the symphyion. Bean's data on the natives of the Philippine Islands are especially used; less useful are the works of Miss Teumin and Mrs. Jochelson-Brodsky, who did not succeed in taking the measurement from the apex of the great trochanter. Some questions of morphology are discussed which need further investigations.—V. G.-R.

NOTAS CRANIOLÓGICAS E AS PRETENDIDAS SOBREVIVÊNCIAS NEANDERTALÓIDES NAS PROVÍNCIAS PORTUGUEASAS DO NORTE. By Mendes Corrêa, (A. A.)—*An. Sci. Fac. Med. Porto.*, 1918, iv, No. 3: repr. 20 pp., 1 pl.

Notes on crania from northern Portugal. Author shows a preponderance of elongated forms and of the ovoid type. The cranial type as a whole is plainly related to the Mediterranean, though there is admixture with Nordic and other elements. Certain interesting sexual differences are noted, particularly a relatively greater frequency in the female of the pentagonoid forms of the vault. Three skulls which were supposed to represent survival of the neanderthaloid type showed that such a conclusion was without sufficient foundation.

[TRIBES OF PERSIA.] A sketch map showing the tribal divisions of western Persia is included in Lieut-Col. G. S. F. Napier's article on "The Road from Baghdad to Baku," *Geog. J.*, Lond., Jan., 1919, LIII, p. 9.

ANTHROPOLOGIE DE LA SUISSE. By Pittard (E.) and Sargent (Ch. E.)—*Arch. Suis. d' Anthropol. Gén.*, 1919, III, No. 1, 121-139.

Results of measurements and observations on a series of boys of from 13 to 15 years of age, from the Canton of Vaud (north and west of the Lake of Geneva). They show, in the main, a considerable diversity in head form, with a predominance however of brachycephaly (56 to 70 per cent, according to localities). The nose is commonly lep-

torhinic (in approx. 85 per cent). Blue and grey eyes are more frequent than brown; on the other hand the darker shades of hair, brown and black, are about equally as well represented as the lighter varieties (including blonds and reds). Evidently the population in question is a mixture of the Keltic and Germanic. Further studies in this as well as other cantons appear very desirable.

[SOMALI]. By Puccioni (N.)—*Arch. p. Antr. & Etnol.*, 1917, XLVII, 13-15.

A preliminary communication on author's study of the anthropological data obtained on the tribes of the southern portion of Italian Somaliland by the Stefanini-Paoli expedition. The data permit the recognition of four types, ranging from the negro-like Suahitī, to the Heggi who most approach Euro-Asiatic people.

A STUDY OF THE MENTAL AND PHYSICAL CHARACTERISTICS OF THE CHINESE. By Pyle (W. H.)—*School and Society*, 1918, VIII, 264-8.

Report on measurements and observations made in 1915-17 on Chinese children of Canton, by Dr. J. W. Creighton, under the direction of the author. The subjects studied numbered nearly 500 and ranged in age from 10 to 18. Measurements were also made on 25 adult Chinese women.

The measurements comprised those of stature, height sitting, weight, lung capacity, strength of grip, and the length and breadth of the head. The results show that "in general, Chinese boys and girls are physically inferior to American children of the same age . . . the Chinese boys and girls are not quite so tall, not nearly so heavy, nor so strong, as Americans of the same age. . . . The amount of air space per pound of weight in the case of Chinese boys is 10 per cent less than that of American boys, and that of girls about 8 per cent less than that of American girls. . . . Averaging the various tests for all the ages, we find that the Chinese boys come nearer to equaling American boys, by about 12 per cent, than the Chinese girls come to equaling American girls."

Measurements of the head indicate that the Cantonese children are on the average moderately brachycephalic. Measurements of speed response in both hands show the Chinese boys to be faster than the American, but the Chinese girls not quite so fast as American girls. As to the mental tests, the Cantonese did not show up as well as do American children; but a consideration of all the factors involved leads the writer to the opinion that the Chinese studied would not have been much, if any, inferior to the Americans with whom they were compared, if they had been subjected all their lives to the same or similar influences."

INDIA—SOME REMARKS ON PHYSICAL ANTHROPOLOGY. By Ray (K. S.)—*Rep. Ind. Assoc. for Cult. Sc. and Proc. Sc. Conv.*, Calcutta, 1918, 3 pp., 3 pl.

Main part of paper devoted to observations on a series of full-size photographs of representatives of the mixed population of Calcutta. Considers very briefly the "Mongolian" eye and the form of the trunk. The cause of the Mongolian eye is possibly "the permanently smaller nasal bones of the yellow races" in which the characteristic plica is present. The trunk, the author believes, shows remarkable racial differences.

The paper is too brief to amount to more than a few suggestions. The author deplores the lack of trained anthropologists in India.

[ORIGINS OF THE JAPANESE.] *Les Ainou des Iles Kouriles*. By Torii (R.)—*J. Coll. Sci. Univ. Tokyo*, 1919, XLII, 337 pp., 2 tables of measurements, 1 map, 37 pl.

Report of archeological and ethnological studies on the small remnants of the Ainu of the Kuriles Islands, including some data on their physique, and the author's deductions as to the origins of the Japanese.

The measurements extend only to 13 males (18-54 yrs.) and 14 females (5-38 yrs.), of more or less mixed blood (with Russians, Kamchadales, Japanese, and even Aleutes), and while inadequate, indicate that the people were physically probably identical with the Ainu of Yezo and Karafuto.

As to the origins of the Japanese, the author's deductions are as follows (317-8): (1) The oldest Neolithic "stations" explored are certainly and exclusively Ainu sites, and may date as far back as 3,000 to 4,000 years B.C. (2) Next to these, from about 1,000 to 2,000 years B.C., there appear numerous other stations, also Neolithic, but of Tungus origin. (3) From 1,000 to 200 years B.C. we see the appearance of "mixed" sites, in which objects of the Ainu and Tungus cultures occur together. This indicates a mixture of the two races. Some of the Ainu, however, took, evidently, refuge in the mountains and the less favorable localities, abandoning the best regions to the stronger Tungus and the Tungus-Ainu mixed tribes. (4) From the seventh or eighth to the second centuries B.C. also, the Neolithic character of the Tungus and mixed sites begins to show a change from the purely Neolithic to the age of metals, probably under the effect of new waves of invasion, Tungus or Indonesian. This parallels what was happening at about the same time with the Mongoloids of northern and northeastern China. The dates here given are, of course, not decisively established. (5) Finally, about the seventh and sixth centuries B.C., the Yamato-Tungus peoples come from Korea—the original mother-country of the Japanese. They come under the leadership of Ninigi-no-Mikato, and bring with them certain sacred treasures, which to this day are in Japan the symbols of imperial dignity. They arrive on the Kioushiou island and establish, together with the native populations, what actually becomes the Japanese Empire and nation.

ABNORMAL CLASSES: PATHOLOGY; TERATOLOGY

A PRACTICAL METHOD FOR THE EARLY RECOGNITION OF FEEBLE-MINDEDNESS AND OTHER FORMS OF SOCIAL INEFFICIENCY. By Berry (Richard J. A.) and Porteus (S. D.)—*Med. J. Austr.*, Aug. 3, 1918, repr. 15 pp.

As a result of prolonged research, the authors put forward what they believe to be a practical method for the early recognition of feeble-mindedness and other forms of social inefficiency. This method consists of the ascertaining of the individual's brain capacity and its comparison with the percentile brain capacity of the population. From this it can be seen whether the individual approximates more nearly to the normal, or to some definitely recognizable form of abnormality. This examination is then supplemented by such physical and psycho-physical tests as have been proved to have diagnostic significance; and the total results are correlated with the clinical, personal, family, and educational history of the individual, the outcome being interpreted in the light of the individual's social environment.

In order to establish approximate norms of the cubic capacity of the skull for different ages, the authors "have examined some 10,000 children and university students, with control cases drawn from known abnormal sources. . . . Having determined the mean capacity of brain of the normal living child, it next became necessary to determine the range of variation from the mean, and to determine how far, if at all, extremes in this range were to be regarded as abnormal." Proceeding upon their hypothesis that "striking deviation from the normal in brain size will tend to be associated with mental abnormality," they next submitted those cases which fell below the level of the 10 percentile, or above the 90 percentile, to a psychological examination with the following results: Of the microcephalic group, 50 per cent were found to be at distinctly subnormal mental levels, but only 5 per cent were found above the average intelligence. "That all small heads are not attended with subnormal intelligence is simply due to the fact that head measurements cannot differentiate between the varying contents of the skull—fluid, neurone, or neuroglia." Of the macrocephalic group, on the other hand, 14 per cent were of subnormal intelligence, and 25 per cent above average intelligence.

The study as a whole has revealed: (1) That head measurement alone is, and must always be, an uncertain guide as a measure of intellect or its lack. (2) That, as mental development is entirely dependent on brain matter, striking deviation from the normal in brain size tends to be associated with mental abnormality. (3) That when this deviation attains a certain sufficiently high-degree, it must be revealed by head measurement and the calculation therefrom of brain size. (4) That such cases of striking deviation are due, in many instances, to developmental failure of the outer, supra-granular, or "intellectual" layer of the cerebral cortex, and as this necessarily means a greatly diminished number of myelinated neurones, there

will be a smaller sized brain, which head measurement, even in its present imperfect stage, is capable of detecting. Hence, small-headedness will be of more diagnostic significance than large-headedness.

UEBER ALBINISMUS. By Velhagen (—)—*Muench. med. Wochenschr.*, 1917, LXIV, No. 26, 845.

Reports the results of macro- as well as microscopic examination of the eyes of a full albino male of 23 years of age, who had high grade myopia and marked nystagmus. This is the third case of such an examination on record and the results in the three instances are practically identical. The choroid, the iris proper and the retina up to ora serata, were entirely devoid of pigment; but the epithelium of the corpus ciliare was somewhat pigmented. The retina was normal, with the rods and cones however, rather mixed up. The macula lutea was not differentiated and could not be distinguished from the fovea optica.

[RACIAL PATHOLOGY.] Annual Report of the Rockefeller Foundation for 1917. By Vincent (George E.), President; 8vo, New York, 1919, 379 pp.

This report gives not only much interesting information on the still but very little known medical activities which are being carried on in different parts of the world under the Rockefeller Foundation, but includes also considerable statistical material on the geographical distribution of the hookworm disease, together with an outline of steps carried on for the control of malaria and tuberculosis.

PROBLEMS OF SUBNORMALITY. By Wallin (J. E. Wallace)—12mo, Yonkers, N. Y., (World Book Co.), 1917, xv, 485 pp.

The author, who is Director of the Psycho-Educational Clinic, Board of Education, St. Louis, deals in this comprehensive volume with the "four fundamental questions relating to mentally subnormal individuals: First, the question of the development of an adequate art of differential diagnosis of the different degrees and types of mental subnormality; second, the question of providing differentiated educational treatment in accordance with the diagnosis for different types or classes; third, the question of the organization of adequate systems of after-care, after-guidance, and control; and, fourth, the question of the development of preventive measures, whether eugenical or euthenical, designed to reduce or eliminate the army of subnormal incompetents." The book is divided into seven chapters (besides Index and Bibliography), which are devoted to: (I) Changing Attitudes Toward the Subnormal; (II) Who is Feeble-Minded?; (III) General Principles and Facts to be Recognized in the Organization of Work for Mentally and Pedagogically Retarded Children; (IV) The Problem of the Feeble-Minded in Its Educational and Social Bearings; (V) The Problem of Epilepsy in Its Psychological,

Educational, Social, and Medical Relations; (VI) State Provisions for Defective Children; and (VII) The Hygiene of Eugenic Generation.

The book is filled with statistical data and references—perhaps too much so to be readily digestible; but it rather neglects the more strictly somatological part of the subject. The discussions and conclusions, however, are quite sound. This is particularly true of the section dealing with the problem as to “who is feeble-minded” and that on eugenics. In the former the author warns that, “The present day tendency to play fast and loose with such vague and undefined concepts as ‘defective children,’ ‘mental deficiency,’ ‘mental defect,’ ‘defectiveness,’ ‘subnormality,’ and ‘feeble-mindedness,’ ‘morosity,’ and ‘criminal imbecility’ when applied to mentalities of X and over, and to base vital practical action on diagnoses based on such vague concepts, is not only inexcusable but it constitutes a positive bar to sane progress in the study of the problems of mental deviation”; and concludes, “It is necessary to emphasize that there are all kinds and all degrees of ‘mental defect,’ ranging from a specific defect of memory or from a slight degree of mental retardation down through backwardness, dullness, ‘borderlinity,’ and the various degrees of feeble-mindedness. The fact that a person is classed as ‘mentally defective’ or has a ‘mental defect’ proves neither that he is genuinely feeble-minded nor that he is irresponsible.”

The chapter on Eugenics ends with the timely postulate that, “Eugenics is not merely a biological conception of life: it is a system of dynamic ethics that must function in the workaday life of the people.” And there are numerous practical suggestions in the book which will be found of value.

INFLUENZA AMONG AMERICAN INDIANS. The following is a summary tabulation of cases (as reported) and of deaths from influenza among American Indians during the period October 1, 1918, to March 31, 1919, the data having been furnished through the courtesy of the Office of Indian Affairs, Department of the Interior.

The period for which the foregoing statistics are given covers the first epidemic period. It was pointed out by the Office of Indian Affairs that a second epidemic invasion occurred in certain localities after April 1, 1919, but the statistics of this second epidemic are not yet available.

The morbidity statistics probably are not complete, but taking into consideration the governmental supervision of Indian affairs, greater dependence may be placed upon these morbidity reports than upon those received through the usual channels. However, the case rate and the case fatality rate have been designated in the table given above as “indicated rates.” Even were the morbidity reports complete for the Indian population, the lack of complete morbidity reports in other localities and for other races in the United States renders impossible any comparison of incidence or case fatality between Indians and other races or the general population.

NUMBER OF CASES OF INFLUENZA REPORTED AND OF DEATHS FROM INFLUENZA
AMONG AMERICAN INDIANS DURING THE PERIOD OCT. 1, 1918-MAR. 31, 1919,
BY STATES AND GEOGRAPHIC DIVISIONS: INDICATED MORBIDITY RATE AND
CASE FATALITY RATES AND MORTALITY RATES.

Geographic Division and State	Population	Number of Cases	Number of Deaths	Indicated Case Rate per 100	Death Rate per 1,000	Indicated Case Fatality Rate per 100
ATLANTIC STATES						
New York.....	5,982	800	80	13	13.4	10
Florida.....	585	66	10	11	17.1	15
North Carolina.....	2,343	781	37	33	15.8	5
Total.....	8,910	1,647	127	18	14.3	8
CENTRAL STATES						
Michigan.....	1,097	50	2	5	1.8	4
Wisconsin.....	9,696	2,557	156	26	16.3	6
Kansas.....	2,275	860	20	38	8.8	2
Nebraska.....	2,834	861	60	30	21.1	7
North Dakota.....	9,216	2,349	120	25	13.0	5
South Dakota.....	23,890	8,559	755	36	31.6	9
Minnesota.....	5,792	1,633	85	28	14.7	5
Oklahoma.....	118,227	15,217	861	13	7.3	6
Iowa.....	356	125	9	35	25.0	7
Total.....	173,383	32,211	2,068	19	11.9	6
MOUNTAIN STATES						
Arizona.....	45,707	17,237	1,948	38	4.3	11
Colorado.....	1,222	399	59	33	48.3	12
Idaho.....	4,208	634	72	15	17.1	11
Montana.....	12,079	2,037	138	17	11.4	7
Nevada.....	2,854	964	49	34	17.2	5
New Mexico.....	22,005	10,550	1,214	48	55.2	12
Utah.....	1,704	448	72	26	42.6	16
Wyoming.....	1,696	16	1	1	.6	6
Total.....	91,475	32,285	3,553	35	38.9	11
PACIFIC STATES						
California.....	16,416	4,398	256	27	15.6	6
Oregon.....	4,355	1,097	94	25	21.6	9
Washington.....	10,315	2,013	172	20	16.7	9
Total.....	31,086	7,508	522	24	16.8	7
Grand total.....	304,854	73,651	6,270	24	20.6	9

The mortality rates, however, show that the epidemic was extremely severe among the American Indians. During the six months period from October 1, 1918, to March 31, 1919, over 2 per cent of the Indian population died of influenza. The mortality among Indians in the Mountain States, especially in Colorado, Utah, and New Mexico, was very high. For the Indian population as a whole, the annual

mortality rate from influenza alone during the six months period was 41.2 per 1,000, which is far above that for the general population—roughly about four times as high as that for the larger cities in the United States during the same epidemic period.

Public Health Reports, Wash., May 9, 1919, xxxiv, No. 19, 1008-9.

THE INFLUENZA IN INDIA. *Brit. Med. J.*, April 5, 1919, p. 417.

According to late estimates, up to the end of November, 1918, "not fewer than 4,899,725 persons (about 2 per cent of the whole population) died of influenza or its complications in British India, the vast majority within the space of two months. Making allowance for the native states, not less than six million persons perished in India. The disease, which, at any time within the last ten years, most of us would have regarded as lightly as Sydenham spoke of scarlet fever, in a few weeks destroyed more than half as many human beings as the dreaded bubonic plague killed in twenty-years. The explanation suggested for this enormous death roll is that Indians have a low resisting power to pneumonic infection." The fatality rate for Indian troops appears to have been at least three times that found among British troops in India.

THE AMERICAN INDIAN

THE BOLIVIAN INDIAN. The entire July, 1918, number (No. 47) of the *Boletín de la Sociedad Geográfica de La Paz*, is devoted to a study of the Bolivian Indian. *The Geographical Review*, New York, vii, 1919, pp. 112, 113.

According to the census of 1900 of the total population (1,816,271) 50.91 per cent was pure Indian, while 26.75 per cent was classified as being of mixed blood and only 12.72 per cent as "white" (the remaining 9.62 per cent being about equally allotted to persons not enumerated and uncivilized Indians). As a matter of fact, it is doubtful if the 12.72 per cent classed as "white" would amount to more than 4 or 5 per cent if all with Indian blood in their veins were excluded. Thus it will be seen that the population of Bolivia is predominantly Indian. In one department, that of La Paz, 75.61 per cent is given as pure Indian and 8.90 per cent *mestizos*, leaving only 8.13 per cent classified as "white." In this one department the total number of Indians was 333,421. (In the whole of the United States there are 335,998.)

The increasing economic importance of the aboriginal race has awakened new interest in this long-neglected ethnical element. As the erudite Bolivian geographer, Dr. Manuel Vicente Ballivian, says in the introductory paragraphs of the *Boletín*, the leaders of the nation are coming to realize the country's dependence upon the Indian. He carries on all the agriculture, he shepherds the great flocks of sheep, llamas, and alpacas, he supplies almost all the labor for the mines, while as a soldier he is incomparable, because of the great endurance displayed in marches over the high plateau. Moreover it is doubtful

if immigrants can ever take his place, since acclimatization to the peculiar conditions of the highlands (8,000–14,000 feet above sea level) is very difficult.

The two principal races of the plateau (the Aymaras and the Quechuas) are described at length in this symposium: their environment, their languages, their character, customs, and religion. One chapter is given to a discussion of the work done by Bandelier in Bolivia. Another treats briefly of the *callahuayas*, the traveling doctors of the Andes, described some time ago in the *Review* (Vol. 4, 1917, pp. 183–196).

A CRANIOMETRIC STUDY OF THE MICMAC SKULL IN THE PROVINCIAL MUSEUM OF NOVA SCOTIA. By Cameron (John)—*Trans. Nova Scot. Inst. Sc.*, 1919, xv, 1–31.

Our knowledge of the physical type of the Canadian Algonquins is still so meager, that careful reports on even single specimens are of interest. Regrettably the history and racial purity, and even the sex of the specimen under consideration, are uncertain. The skull is labeled as that of a male, but the illustration speaks much more for a female; and Professor Cameron himself mentions a number of features which speak for such an identification. The principal dimensions of the specimen are, length max. 18.25, breadth max. 14.75, and basion-bregma height 13.35 cm. The cephalic index is 80.8, orbital 88, nasal 50. The capacity is estimated at 1495 cc., which seems too high.

An interesting procedure of studying the face is recommended. It consists of drawing, on a projection of the skull, of horizontal lines through the nasion, the lower border of the orbits, the *akanthion* and the *prosthion*. These lines divide the face into upper, middle and lower horizontal areas, which, there are indications, may show significant differences in different races.

THE CENTRAL ARAWAKS. By Farabee (Wm. Curtis)—*Anthrop. Publ's University of Pennsylvania Museum*, ix, Phila., 1918, (1919), 288 pp., map, 36 pl., 13 fig.

General report on author's observations among the tribes of southern British Guiana and adjacent parts of Brazil. The bulk of the memoir is devoted to notes of ethnological character, and to vocabularies. Somatological observations are only briefly touched upon (pp. 169–174), having been published more in full in the *AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY* (I, 1918, pp. 427–441). There are, however, seven pages of detailed measurements.

THE MAYA INDIANS OF SOUTHERN YUCATAN AND NORTHERN BRITISH HONDURAS. By Gann (Thomas W. F.)—*Bull.* 64, Bur. Amer. Ethnology, 8vo, Washington, 1918, 146 pp., 28 pl., 84 fig.

This valuable report is divided into two parts, the first dealing with the Customs, Ceremonies, and Mode of Life of the Indians in question, while the second is devoted to Mound Excavation in the Eastern Maya

Area. The first part includes various items of interest to Physical Anthropology, which may be resumed as follows:

All of the tribes considered "are of the same physical type; in fact, there can be little doubt that they are the direct descendants of those Maya who occupied the peninsula of Yucatan at the time of the conquest. Physically, though short they are robust and well proportioned. The men average 5 feet 2 inches to 5 feet 3 inches in height, the women about 2 inches less. The skin varies in color from almost white to dark bronze. The hair of both sexes is long, straight, coarse, black, and luxuriant on the head, where it extends very low over the forehead, but is almost entirely absent from other parts of the body. The women usually wear their hair hanging down the back in two plaits. Their faces are round and full, with rather high cheek bones; the skull is highly brachycephalic in type. . . . The eyes are large and dark brown, the ears small and closely applied to the head, the nose rather broad, and the jaw prognathous. The mouth is fairly large and the teeth excellent, though toward middle age they become greatly worn down in many individuals from eating corn cake impregnated with grit from the stone metate, and from the same cause they are frequently much incrustated with tartar. The figure in both sexes is short and broad. The long bones and the extremities are small and delicate. Both men and women are, however, capable of considerable and prolonged exertion. The former can carry loads of 150 pounds for 20 miles in the macapal, a netted bag which is slung over the back and held up by a band passing round the forehead, while the latter can work for hours at a time grinding corn on the metate without apparent fatigue. Many of the younger women would be considered very good looking. . . . Children begin carrying small macapals at a very early age, and it is probably to this habit, and not as Landa suggests, to the custom among the women of carrying their children astride the hip, that the prevalence of bowlegs among the Indians is due. These people have a peculiar and indescribable odor, rather pleasant than otherwise; it is not affected by washing or exercise, is much stronger in some individuals than in others, and is perceptible in both sexes and at all ages. The women are, on the whole, both physically and mentally superior to the men. . . . The Indian girls married formerly at about 14 or 15, the boys at about 17 or 18 years. After the conquest of Bacalar, however, and the expulsion of Yucatecans from Indian territory, a law was passed making marriage compulsory for all girls of 12 years of age and upward. . . . The babies and smaller children in general are pretty, merry little things. . . ."

As a consequence principally of alcoholism, the marriage ties are rather loose, with the result that in British Honduras there are to be found all degrees of racial mixture "between Indian women and European, East Indian, Chinese, and Negro men, who, again intermarrying, produce a bewildering racial kaleidoscope.

"The Indians are a short-lived race, a fact due partly to their in-

digestible and badly cooked food and partly to the prevalence among them of malarial fever, with accompanying anemia and splenic enlargement, but chiefly to overindulgence in alcohol whenever an opportunity offers. Notable exceptions to this rule are, however, not uncommon, and once an individual passes the four-score mark he or she is quite likely to live to well over 100 years; dried up, wrinkled, and feeble, but clinging to life with an almost incredible tenacity. . . . Indian men and women of all ages and classes, when attacked by any serious malady, are found to be lacking in vitality and stamina; they relinquish hope, and relax their grip on life very easily, seeming to hold it lightly and as not worth a fight to retain. . . . Malaria is without doubt the chief scourge of the Indian's existence. . . . In winter when the nights are cold the Indians often lie out all night in the wet, a practice which frequently results in pneumonia and death. . . . Smallpox invading an Indian village is a terrible scourge, far worse than in a more civilized community of the same size, where partial immunity has been acquired. . . . Venereal diseases of all kinds are remarkably rare among all these Indian tribes."

FORTY-NINTH ANNUAL REPORT OF THE BOARD OF INDIAN COMMISSIONERS (1917-18). Government Printing Office, 8vo, Washington, D. C., 93 pp.

The present report is marked by the omission of the usual statistical data on Indian population. These data, however imperfect, were useful to the student of Indian questions, and it is hoped that their omission from these reports will not be a permanent feature. There are brief articles on marriage, delinquency, Indian soldiers, a health campaign in Oklahoma, and state of morals on the reservations, which are of more or less interest to anthropology, but none are sufficiently detailed or documented to be of much value. The whole publication will be found distinctly less useful to science than the average of the previous reports, which is much to be regretted, and demands an improvement. Government publications of this nature and importance should not be allowed to run to seed.

RECENT DISCOVERIES ATTRIBUTED TO EARLY MAN IN AMERICA. By Hrdlička (Aleš)—Bull. 60, Bur. Amer. Ethnol., 1918, 67ff., 14 pl., 8 figs.

This bulletin covers an additional chapter of the subject of man's antiquity on the American continent, dealt with in Bulletins 33 and 52 of the Bureau of American Ethnology. The author deals with the various finds of human skeletal remains in America attributed to early man, made since the publication of the bulletins just mentioned. He gives the history and a discussion of the finds at Cuzco, Peru, at the La Brea ranch near Los Angeles, Calif., and at Vero, Fla. It is shown that none of these finds, as none of the preceding finds of this nature on the American continent, can be accepted as demonstrating beyond many serious doubts the existence on this continent of man

of any but very moderate antiquity, or any other race than the Indian. The circumstances of the Vero finds in particular are shown to conform much more with those of ordinary Indian burials than those that would attend accidental inclusions of man of geological antiquity.

LOS FENOMENOS MICROVOLCANICOS EN EL PEDREGAL DE SAN ANGEL. By Wittich (Ernesto)—*Mem. Soc. Cient. "Antonio Alzate,"* Mexico, xxxviii, No. 3, 1919, 101-120, 10 pl.

To the southwest of the City of Mexico, in the foothills of the sierra Ajusco, is found a great field of lava known under the name of "Pedregal de San Angel o de Tlalpan." Under this lava in various places have been found potsherds, metates, fragments of obsidian, idols, and other objects, which evidently belong to a well-advanced and recent culture; the idols, in fact, resemble very much those of the Aztecs. Under the lava there have also been found skeletal remains of man, which at first were regarded as possibly very ancient. These remains, too, show the modern Indian type. "It may therefore be concluded, that the Pedregal de San Angel o de Tlalpan is a quite modern formation, representing the last volcanic paroxysm in the Valley of Mexico. Its exact age cannot be determined; but considering that the first century of the Christian era was a period of many volcanic phenomena, the author inclines to the opinion that the eruption in question may possibly date also from that epoch."

II. WAR ANTHROPOLOGY: THE PEOPLES AT WAR

LES RACES ET LES NATIONALITÉS EN AUTRICHE-HONGRIE. By Auerbach (Bertrand)—2d ed., 8°, Paris, 1917, xxvi, 488 pp., 1 map.

This is a second and revised edition of this well-known work. The book deals in a comprehensive manner with the involved and multiple racial problems of the former Austro-Hungarian monarchy. The sixteen chapters, with the introduction, are devoted, respectively, to Race and Nationality; The Question of Nationalities in Austria-Hungary up to the Time of the Austro-Hungarian Agreement; The Methods and Results of Ethnic and Linguistic Censuses; Alpine Austria; Tirol and Vorarlberg; Bohemia, Moravia, Silesia; Galicia, Bukovina; The Adriatic and Balkan Austria; Hungary; The Magyars, Germans, Northern Slavs; Transylvania; The Southern Slavs; Croatia; Fiume; The Gypsies; and Bosnia and Herzegovina.

The work, while in some parts not fully up to date or wholly correct, is nevertheless a serious, non-propagandist, well-documented production, which must have been found very serviceable during the preparatory tasks of the peace negotiations, and which can safely be recommended to the student of central-European ethnography.

LA SYRIE ET LES SYRIENS. By Bernard (Augustin)—*Ann. Geogr.*, Paris, 1919, xxviii, No. 151, 33-51.

Article essentially of political nature, but containing information

of interest to anthropology not easily found elsewhere. The long, narrow, and once much populous strip of territory comprised under the term "Syria," has today but $3\frac{1}{2}$ –4 millions of inhabitants. A strong emigration movement, moreover, existed in the region before the war; the total number of Syrians outside of their country may already be estimated at 500,000. Increase of the population is slow, due mainly to generally bad hygienic conditions, and high infant mortality. Anthropologically the population is one of the most mixed, and that since antiquity. The two physical types which predominate today, are the Armenoid, and the Arabo-Semitic. National unity does not exist, there are merely localized religious affiliations—Mohammedan, Christian, or Jewish.

GERMAN COLONIZATION IN EASTERN EUROPE. By Brunhes (Jean) and Camille Vallaux—*Geogr. Rev.*, 1918, vi, No. 6, 465–480.

This is an amplification of an article by same authors published under the title of "Les éléments géographiques de la guerre," in *Scientia*, 1918, xxiii, 11–124; and would be a contribution of considerable anthropological interest were it not for some bad errors, and for the rather general and political than strictly scientific treatment of the subject. Thus the "Chudes" were not "a Slav tribe from the region of Novgorod" (p. 470) and it was not they who called Rurik with his Varangians; the identity of the Ukrainians is not explained by the categorical statement that they are "the Little Russians" (p. 475); there are no Austrian parts of the Ukraine (p. 476); etc. The conclusions of the authors, made before the end of the war now appear curiously out of date; but they are correct in their opinion that in the desires of the Germans, so far as Russia was concerned, there was always something of geography as well as of history; and that it was only because of the ignorance and thoughtlessness of western Europeans that the appetite of the Germans for general conquest has appeared to develop so suddenly.

THE SLAVS. By Hrdlička (Aleš)—*Czechoslovak Review*, 1918, ii, No. 10, 180–187.

This paper deals with the origin, subdivisions, numbers, mixtures, and the physical, physiological and mental characteristics of the Slav peoples in general. It includes the most important demographic statistics.

THE RACES OF RUSSIA. By Hrdlička (Aleš)—*Smithson. Misc. Coll.*, 1919, lxix, No. 11 (Publ. 2532), 21 pp., 1 map.

Reprinted in full in *Scientific American Supplement*, June 7 and succeeding numbers, 1919.

The object of this publication is to furnish at the present time, when the attention of the world is so much occupied with Russia, a simple account, as far as possible, of the origin, spread, mixtures and characteristics of the Russian people. It is shown that notwithstanding

the admixtures on all sides, Russia is essentially a Slav country, that the sturdy, well-preserved population is increasing at a higher rate than any other large branch of the white race, and that it is bound to play a very important part in the future.

THE REGIONS OF MIXED POPULATIONS IN NORTHERN ITALY. By Marinelli (Olinto)—*Geog. Rev.*, 1919, VII, No. 3, 129-148, 1 map.

A dissertation on the racial composition of the population of the formerly Austrian territories now occupied or claimed by Italy. The presentation of the facts is distinctly biased and the article is really but a higher class of Italian propaganda. As far as the non-Latin contact nationalities are concerned, Italian men of science have, it seems, adopted largely the pre-war spectacles of the Germans.

(1) LITHUANIA'S CASE FOR INDEPENDENCE. By Norus (T.), and J. Zilius—Issued by the Lithuanian National Council, 8vo, Washington, D. C., 1918, 96 pp. (2) LITHUANIA. By Bielskis (J. J.)—Issued by the Lithuanian National Council, 8vo, Washington, D. C., 1918, 47 pp. (3) LITHUANIA; MAP OF.—Issued by the Lithuanian Bureau of Information, Lausanne, Switzerland, Fold., 1918. (4) SIDELIGHTS ON LIFE IN LITHUANIA.—Issued by the Lithuanian National Council, 8vo, Washington, D. C., 1918, 14 pp. (5) THE HISTORY OF THE LITHUANIAN NATION. By Jusaitis (K. A.)—Publ. by the Lith. Cath. Truth Soc. (Scribners), 12mo, 1918, 156 pp.

Lithuanian propaganda literature, largely historic and statistical, and naturally favoring the people it deals with, nevertheless of some anthropological interest, particularly Nos. 1 and 5. No. 5 contains four portraits of Lithuanians, but most of the physiognomies could readily be taken for Ukrainian or Bielo-Russian.

RECHERCHES ANTHROPOLOGIQUES SUR LES ROUMAINS DE TRANSYLVANIE. By Pittard, (E.) and É. Sargent—*Rev. Anthropol.*, 1919, XXIX, Nos. 3-4, 57-76.

Results of measurements and observations on 175 male and 19 female Roumanians from Transylvania. The people are of medium stature (m. 167.0, f. 152.9 cm.), which exceeds slightly that of Roumanians proper. They are brachycephalic (C. I. m. 84.4, f. 84.6), in which they also exceed somewhat their patriots from Roumania. The nasal index is with rare exceptions meso- and leptorhinc. Dark eyes are frequent (41.7 per cent in the males), dark hair is general. No case of blond hair was encountered. The nose is predominantly straight. A fuller future report on these studies is contemplated.

THE ETHNOGRAPHY OF THE YUGO-SLAVS. By Stanoyevich (Milivoy S.)—*Geog. Rev.*, 1919, VII, No. 2, 91-97.

Paper of a general nature discussing the origin, stock unity and main subdivisions of the southern Slavs. The three main groups are the Dinaric (in Istria, Croatia, Dalmatia, Bosnia-Herzegovina, Montenegro, northern Serbia); the Pannonic (in Carniola, Slavonia, Bačka,

Banat); and the Macedonian (in southern Serbia, Macedonia). More or less mixture has taken place between these groups and the old Illyrians, Romans, Greeks and Vlachs.

The author, or perhaps the editors, have not been very fortunate in the orthography of Slavic names; thus *Jireček* has become *Yirechek*, under which form it would be hard to find this well-known author on the Balkan peoples in library catalogues and works of references.

DUTCH AND FLEMISH COLONIZATION IN MEDIEVAL GERMANY. By Thompson (James Westfall)—*Am. J. Sociol.*, xxiv, 1918, 159-186.

Historical notes on the organized settling, during the twelfth and thirteenth centuries, of the lowlands of the Rivers Weser, Elbe, Havel, Oder, and in part even the Vistula—lands most of which belonged formerly or up to that time to the Wends (Slavs)—by Flemish and Dutch immigrants, brought or attracted for the purpose by the Germans.

LES PREMIERS HABITANTS DES PAYS YUGOSLAVS. By Županič (Niko N.)—*Rev. Anthropol.*, 1919, xxix, 10-34.

This is a useful anthropological sketch of the early inhabitants of the south-slavic countries. It deals with the paleolithic as well as the neolithic and later human remains of the territory. The neolithic and eneolithic populations of the Balkan peninsula are grouped under the name Pelasgi. During the bronze age these mingled with the Hellenes, Thracians and Illyrians, and during the La Tène period suffered an infiltration of the Kelts. At the commencement of the medieval times appeared the Slavs, who descended from the Sarmatian plains and the Carpathians, invaded Pannonia as well as the Balkan peninsula, mixed with the ethnic amalgam of those countries, and were modified through this admixture into the present "Adriatic race" of tall brunets with brachycephaly. . . . The interesting paper is unfortunately marred by some fanciful etymologies in trying to establish the Mongolian origin of the modern brachycephalic people. Matters of this nature should be left to expert philologists.—TRUMAN MICHELSON.

EFFECTS OF THE WAR

HEALTH AND WAR. By Fisher (Irving)—*Am. J. Publ. Health*, 1918, viii, No. 8, 559-563.

A brief, eloquent plea for a greater and more rational attention in this country, after the war, to life conservation and health, particularly among the laboring classes. "The war is a means of destroying human life; and therefore in its reaction will probably be the greatest stimulus to life conservation. . . ." The labor problem and the health problem fit one into the other. "And we can answer labor's question: 'What will the country do for us,' very largely by giving health to labor. . . . We ought to establish a national department of health as one of the consequences of this war." In order that the

laboring man may live a proper life, however, he must satisfy something more than the instinct of self-preservation and bodily health, he must live a complete all-around life, in which all the fundamental instincts of the human being will find an expression.

SOME PHYSICAL IMPROVEMENTS IN NATIONAL ARMY MEN UNDER MILITARY TRAINING. By Hildebrandt (Capt. F. M.)—*Science*, 1919, XLIX, 404-408.

A study is made of changes in weight, height, and chest expansion of six groups of men at various army camps in the United States during the period of training for overseas duty.

At the beginning of training the men were of normal weight or above the normal as given in tables used by life insurance companies, but show an average gain of 4.4 pounds per man by the end of the training period. In one group the change in chest motility was studied and showed an increase of 0.7 per inch per man.

THE EFFECTS OF THE WAR ON THE RACE. By Hrdlička (Aleš)—*Art and Archeology*, 1918, VII, No. 9, 403-407.—THE EFFECTS OF THE WAR ON THE AMERICAN PEOPLE. *Scientific Monthly*, 1919, VIII, June number, 542-545.

Similar articles, dealing with the untoward effects of the war on the American people on the one hand, and with the many and important compensations on the other. The general conclusions are that the late war, so far as the American people are concerned, did no great or permanent biological harm to the organism as a whole or to any of its vital parts; and that, on the other hand, it resulted in many-sided compensations, which are bound to have a beneficial effect on the further development, biological and otherwise, of this nation. All of which does not apply, unfortunately, to most of the European peoples who have participated in the war. They have been wounded deeply and their recovery is a matter of deep concern to all serious observers.

MEDICINE, A DETERMINING FACTOR IN WAR. From the presidential address of Dr. Alexander Lambert given at the Atlantic Meeting of the American Medical Association and printed in the Journal of the Association. (*Science*, July 4, 1919, L, 8-11.)

The death rate in our Civil War of killed and dying of wounds is given as 33 per 1000, the disease rate as 65 per 1000. In the Spanish War the death rate from battle was 5 and the death rate from disease 30.4 per 1000. In the present war, taking the statistics up to March 28, 1919, we find the rate of death from wounds received in action is 14.2 and that of death from disease is 14.8 per 1000. This includes the army on both sides of the ocean. The statistics of the American Expeditionary Forces, with an average strength of 975,716, reveal a rate of death from wounds in action of 31.26 per 1000 and a death rate from disease of only 11.23 per 1000. Of those who died of disease,

pneumonia claimed 9.146 per 1000. Typhoid mortality, which constituted 22.4 per cent in the Civil War and 60.5 per cent of all deaths in the Spanish War, was reduced to 0.4 per cent. Deaths from dysentery show similar reduction. . . . What are the lessons we can draw from all we had learned through the war for the future? The climax to which everything points is that, "If this nation, through its present medical knowledge, has within its grasp the power to control communicable, and hence preventable diseases, there must be established a nation-wide controlling organization for this purpose, a National Department of Health. Over 33 per cent of our younger men were disqualified from the draft for physical defects. There is need of wider supervision of our growing boys and girls to build up a more robust nation, and it is especially urgent in rural districts. If we are to have some form of universal military service, the very necessity of its universality demands some general supervision of the health of the youth of the nation, through protection against the transmissible diseases, and direction over the giving of health to the people as we now give education. This war has also taught that there remains economic value in the maimed and wounded, and it is our duty to develop this value to its fullest extent. The maiming and injury of our workers, in the everyday work of industry, far exceeds each year the battle casualties of this war, and there is an economic necessity and duty to be performed in the salvage and reconstruction of the industrially injured."

THE PRICE OF MILITARISM. For some time a Danish committee has been engaged in collecting information as to the cost of war in terms of human life, and the results as regards Germany have now been issued (Döring, C.—*Die Bevölkerungsbewegungen im Weltkrieg: Deutschland. Bull. Studienges. f. so. Folgen d. Krieges*, Copenhagen, 1919). The data, though still incomplete, indicate that the price paid by Germany amounts to about $5\frac{1}{2}$ million lives, more than two of these millions actual deaths (military and additional civil), the balance made up of the births lost. The actual population is some 2,700,000 less than in 1913, the proportion of the sexes utterly disturbed. At ages 20 to 50 the sex ratio before the war was 1,000 males to 1,005 females, now it is 1,000 males to 1,155 females. Of men of military age 13 per cent. are gone. In Dr. Döring's words, "To a definite loss of more than $5\frac{1}{2}$ million human beings is to be added a long continuing decline of the birth rate and for years to come a higher rate of mortality." This outside of the crippled and otherwise reduced in potentiality.

NOTES

According to the Annual Report of the Conservator of the Museum of the Royal College of Surgeons of England, steps are being taken to restore to their proper places the precious collections which include much anthropological material and which when London became subject to aerial bombardments were removed to protected corridors and cellars. On three occasions bombs fell in the neighborhood, but except for slight damage from stray fragments in one case the Museum escaped unscathed. During the latter years of the war the collections were greatly enriched by war specimens.

Physical Anthropology in the Peking Medical College.—The reorganized Peking Medical College, which will open for the instruction of students in October, 1919, will include in the Department of Anatomy, according to the just issued Annual Announcement (Peking, April, 1919), an elective course in Physical Anthropology. This course is "intended to give the student a general conception of the antiquity of man, of racial variation and of the applications of the science of anthropology to the problems of the present day." The Department is under the direction of Prof. Edmund V. Cowdry, with Dr. Davidson Black as Professor of Embryology and Neurology. Professor Black, before his departure for China, received a course of instruction in Anthropometry at the U. S. National Museum.

Anthropological Data on the Natives of Alaska.—The following encouraging correspondence is self-explanatory:

July 18, 1919.

CHIEF OF ALASKA DIVISION,
U. S. Bureau of Education,
Washington, D. C.

Dear Sir: In perusing your report for 1916-17, the undersigned is struck with the lack of details which would be of use to Science. The natives of Alaska are but little known from either the medical, physiological or anthropological standpoints, and it would be very little trouble for your physicians, nurses and teachers to give us many items of value if they were instructed to do so. It would be quite easy, for instance, to subdivide the natives into full-bloods and mixed-bloods, Esquimaux and Indians; and to give us data on these different groups as to the birthrate, proportion of sexes, mortality, relative prevalence and nature of diseases, and many other items of interest, for which we would be very grateful.

Hoping something may be done in this direction, I am

Respectfully yours,

ALEŠ HRDLÍČKA,

Curator, Div. Physical Anthropology.

DEPARTMENT OF THE INTERIOR
BUREAU OF EDUCATION
WASHINGTON

July 28, 1919.

DOCTOR ALEŠ HRDLÍČKA,
Curator, Division Physical Anthropology,
Smithsonian Institution,
Washington, D. C.

Dear Doctor Hrdlička: Replying to your letter of July 18, I beg to state that I shall, at the beginning of the term in September, request the employees of the Bureau of Education in Alaska to secure, without interfering with their regular duties, such items of medical, physiological, or anthropological interest as would be of value to science, and to send them to me, from time to time, for transmission to the Smithsonian Institution.

The duties of the Bureau of Education's employees in Alaska, as uplifters of the native races, are already multifarious, but they are public-spirited, broad-minded persons, and they will, to the best of their ability, comply with my request.

It is probable that much of the information you desire will be secured in the course of the taking of the Census in Alaska, during the coming winter.

Cordially yours,
P. P. CLAXTON,
Commissioner.

According to *Science* (July 11, 1919), Harvard University is bequeathed, under the will of Dr. J. Ewing Mears, \$100,000 for the study of methods to reform and cure criminals and mental defectives by surgery.

Washington University School of Medicine, St. Louis, has received a grant of \$5,000 to be used for the investigation of hypertrichiasis, from a person whose name is for the present withheld. A committee in charge of the grant has been appointed, consisting of the dean, Dr. G. Canby Robinson; Dr. M. F. Engman, of the department of dermatology, to whom the grant was proposed, and Dr. Charles H. Danforth, of the department of anatomy, who will carry on the investigation, which will be chiefly in the fields of anthropology and heredity.—*Science*, 11-vii-'19.

Summer School of Civics and Eugenics, England.—The Civic and Moral Educational League and the Eugenic Education Society, of England, have organized at Oxford a Summer School of Civics and Eugenics. The school has been organized to meet a widely expressed desire on the part of teachers, health visitors, and social workers. Its aim will be to give these and any other students who care to join opportunities for studying and discussing how civic and social ideals may be developed and maintained, individually and in the community.

The Formal Work of the School falls naturally into two portions:

(1) The Preparatory Course of the first week (Aug. 19-23), dealing

with the scientific basis of educational and social work, and preparing for the following specialized courses in the second week.

(2) In the second week (Aug. 25-31):

(a) The Teachers' Course, dealing with those sides of school work which bear most directly on Civic and Eugenic education.

(b) The Social Workers' Course, dealing with subjects which are of great interest and importance to all responsible for municipal administration, welfare work, club work, and so on.

(c) The Speakers' Training Course, which will be a standard course recognized by the N. C. C. V. D., and intended specially for the nominees of that society, though open to any other students of the school.

A "Roosevelt Institute of American Family Life," to be developed in connection with the eugenics record office of the Carnegie Institution, in Washington, has been proposed to the Roosevelt Permanent Memorial National Committee by the Eugenics Research Association of Cold Spring Harbor, Long Island.—*Science*, 11-VII-'19.

An expedition on a large scale to South and Central Africa has started under the direction of Mr. Edmund Heller. Mr. Raven has been appointed by the Smithsonian Institution as a naturalist, whose chief aim will be to look after zoölogical and anthropological collections. The expedition sailed from New York July 15 for Capetown, and is to be abroad at least a year. It will proceed from there to Victoria Falls, cross into Belgian Congo and then east to Lake Tanganyika where a longer stay is contemplated. Every effort will be made to secure ample series of photographs of the natives, and as large collections as possible of human and anthropoid skeletal material.

The "Anthropological Bureau" of the Čech University in Prague will henceforth be known as the "Anthropological Institute" of that University. The Institute is under the directorship of Professor Jindřich Matiegka.

Partial Destruction of the Anatomical and Anthropological Collections at Freiburg.—In the *Korresp.-Blatt d. D. Ges. f. Anthropol.*, etc., of Juli-Sept., 1917, which has just reached this country, Prof. Eugen Fisher describes, under the title "*Die Zerstörung der Freiburger anatomischen Sammlung*" (pp. 73-4), a partial destruction through bombing and subsequent fire of the valuable skeletal, brain and other collections of the Freiburg University. The total loss could not yet be exactly determined, but is very severe. This applies especially to the irreplaceable prehistoric skeletal material, and to Ecker's and Wiedersheim's collections and exhibits in comparative anatomy and embryology.

Anthropometric Instruments.—Due to the impossibility at present of obtaining anthropometric instruments from Europe, arrangements have been made with a Washington manufacturer for twelve sets of

guaranteed workmanship, each set containing one pair of calipers (*compas d'épaisseur*, H.), one ordinary sliding compass (*compas glissière*), and one large metal sliding compass. These instruments may be seen in figure 1, p. 287, of this number of the Journal. Seven sets have already been contracted for, leaving five at the disposal of anthropologists. Those who desire sets should address the Editor.

The National Research Council has appointed a committee on Pacific explorations to consider and organize coöperative research in the various fields in which investigation is under way in the Pacific area. The first meeting of this committee was held on September 10, at the University of California. In order that through combined effort of the institutions concerned the fullest measure of result may be secured, the committee is especially desirous of securing information as to investigations under way or projected in the Pacific area in fields of research ranging from physics to anthropology. The members of the Committee present at the California meeting were H. E. Gregory, George F. McEwen, W. E. Ritter and J. C. Merriam, chairman. Other members of the committee were unavoidably absent. A meeting of the full committee for the purpose of initiating the investigations planned for the coming year will take place on the Atlantic coast in December.

CORRESPONDENCE

International Institute of Anthropology.—"It would have been more charitable if Dr. MacCurdy had not published the circular letter of the members of the French School of Anthropology. He has thus made it a permanent record of the effect of war hysteria upon scientists.

"Since, however, the letter is now a matter of record, it ought to be known, also, that a considerable number of American anthropologists have protested against the spirit of the communication. My own reply follows:

December 31, 1918.

MR. YVES-GUYOT,

*Director École d'Anthropologie,
15, Rue de l'École-de-Médecine,
Paris, France.*

Dear Sir: I am in receipt of your invitation to express myself in regard to the plan for the proposed International Institute of Anthropology. In reply I beg to say that I shall not join any international organization that discriminates against the scientists of any nation whatever.

Your invective against German science is dictated by passion, not by the spirit of the searcher for truth. If I honor the names of Broca and Topinard, I honor no less those of Virchow and Ranke; if I profit from the study of Tylor, I derive no less benefit from Bastian. I am equally indebted to Boule and Penck, Sergi and Schwalbe, Frassetto and Klaatsch. Durkheim, Rivers and Graebner are equally suggestive to me. Anthropology without the admirable work of von den Steinen, Seler, and Pechuël-Loesche; without the splendid effort of Wundt, without Hahn and Vierkandt would not be what it is.

I do not know how many of our colleagues in France, Italy, England and America are able to read German scientific works, in the condemnation of which they so loudly join. I would suggest to them the reading of Adolf Bastian's "*Völkerhass oder Völkerfriede*." They might perhaps hesitate to take a step of which they themselves will be ashamed when the passions of the day have calmed down, and for which their sons will blush in future time.

I am willing to join in a preparatory organization in which the basis of future organization shall be discussed, but only with the expressed purpose of demanding that the organization shall be a truly international one based on the interests of science, not intended to promote national passions.

Yours very truly,

(Signed) FRANZ BOAS.

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ERUPTION AND DECAY OF PERMANENT TEETH IN WHITES AND NEGROES, WITH COMPARATIVE REMARKS ON OTHER RACES

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I

The following paper is based on records made partly among the Zulu of Natal and Zululand in South Africa, and partly among Whites in Central Europe. The observations on teeth in Africa were undertaken by the writer on the initiative and under the direction of Dr. Aleš Hrdlička, of the Smithsonian Institution, and were carried out during a larger part of 1913-1914, as a part of the plan of comparative studies of the child among primitive peoples.¹ The local opportunities for these studies were most favorable owing to the numerous schools of the American Zulu Missions; and the Missionaries facilitated the work with a helpfulness that has left a deep impression and placed the writer under many obligations.

The present paper comprises the results or observations on 1,008 sub-adult Zulu from all parts of Natal and Zululand. Of these, 492 were males and 516 females, of different ages. The condition and number of teeth of every individual examined were carefully recorded. The age distribution was as follows:

The ages of the children here given may be regarded as quite reliable. Many of the Christianized children knew the exact day of their birth, while in other instances this could be obtained through

¹ See Hrdlička (A.), "Some Recent Anthropological Explorations," *Proc. Nat. Ac. Sci.*, 1915, I, 235-8; and Brief Notes on recent anthropological explorations under the auspices of the Smithsonian Institution, *Ibid.*, 407-410.

the teacher; and among the natives of northern and western Zululand and in some parts of Natal, distant from the towns and missionary stations, it was found that they clearly remembered various historical events of known date, such as for instance the great Zulu war, the first Boer war, the great South African war, and the last Zulu rebellion in 1907. These and other data rendered it possible to ascertain the age of practically all of the subjects examined with a fair degree of accuracy.

TABLE 1. AGES OF SUBJECTS

Years	Male	Female	Years	Male	Female
0-4	2	4	13	47	41
5	8	13	14	32	48
6	29	13	15	34	26
7	16	22	16	17	32
8	34	35	17	19	31
9	31	32	18	9	30
10	47	43	19	12	11
11	31	40	20	55	44
12	69	51	Total	492	516

As to the observations in Europe, they were made on children of several Normal schools, on students of colleges, and on apprentices in different trades in Prague, Bohemia. They were carried out by Prof. J. Matiegka,¹ Director of the Anthropological Institute of the Čech University, and by the writer. For many years Prof. Matiegka has been making extensive investigations of the anthropological conditions and state of health of the children of the schools in Prague,² and the data on the conditions of the teeth of the children is part of this work. The subjects embraced in the work are of Čech extraction and represent fairly well the urban and rural inhabitants of central Bohemia, a population of Slavic origin with some Alpine and Germanic admixture.

Records of detailed observations on the condition and eruption of teeth in colored races are as yet few in number. The writer was able to find but two: Bean's study of the Philipinos, and Hrdlička's investigations on the Indians.³ These standard studies, based on extensive material, together with the above mentioned

¹ Writer is much indebted to Prof. Matiegka for ceding these data for publication and furthering his investigations.

² Partly published in "Vzrůst, vývin, etc., mládeže k. m. Prahy." *Rozpr. Č. Akad.*, VI, No. 17, 1-78 (předl. 1896).

³ See bibliography.

records from Bohemia, furnish a good opportunity for comparison of conditions with those found among the Zulus. Bean studied children from all parts of the Philippine Archipelago, the majority being mestizos, mixed Spanish, Chinese, and Philipinos attending the Manila Normal and Trade Schools and representing the littoral population of the Archipelago. Hrdlička's material consists of full-blooded Indian children from the southwestern part of the United States and northern Mexico.

The present paper deals with permanent teeth only. Little information could be gathered on the temporary set, as the number of sufficiently young Zulu children available for examination was very small.

II

TIME AND ORDER OF ERUPTION OF THE PERMANENT TEETH IN THE ZULU NEGROES

It was found impracticable to make the age groups smaller than one year. In recording permanent teeth, distinction was made between teeth fully erupted and those just erupting through the gums, *i.e.*, those which did not reach the masticatory plane. These erupting teeth are shown in all tables in italics. The following tables give the conditions found in percentages. These percentages have been calculated from the number of permanent teeth erupted or erupting at each age, and for each type of tooth, for the right and left side, and for the upper and lower jaw, separately. Hence, for instance, the figure 86.2 in Table 6 on the right side in column "M," second line, indicates that at the age of six years, out of the 29 boys examined, 86.2 per cent had the "upper right first molar" fully erupted.

In these six tables we can follow the eruption of the permanent teeth in the Zulu. From the figures in italics, indicating the erupting teeth, we see that the period of greatest intensity of eruption of the different types of teeth is between the eighth and the thirteenth year. There is some sex difference in this respect, the girls being somewhat more precocious than the boys, for the period of greatest intensity ends in boys at the thirteenth year and in girls at the twelfth year. As to race differences, the material will be considered in a later chapter. Calculations have been made for upper and lower teeth, and for males and females separately, from the total number of permanent teeth erupted or erupting at each age. The total number of a full set of teeth, that is 16 teeth for each jaw, has been made to equal 100.

TABLE 3. PERCENTAGE OF EACH PERMANENT TOOTH ERUPTED OR ERUPTING AT EACH AGE, IN ZULUS
(The figures in *italics* indicate the erupting teeth)

Age	Number of Cases	Males											
		Lower Jaw						Upper Jaw					
		Right						Left					
		M	M	M	P	C	I	I	C	P	P	M	M
5	8	—	—	87.5	—	—	50.0	50.0	—	—	—	—	87.5
6	29	—	—	89.7	—	—	25.0	25.0	—	—	—	86.2	—
7	16	—	—	3.4	—	—	62.1	86.2	—	—	—	6.9	—
8	34	—	—	100	—	—	93.7	100	100	—	—	—	—
9	31	—	—	97.1	—	—	94.1	100	100	8.8	—	94.1	—
10	47	—	—	100	—	—	2.9	100	100	8.8	2.9	5.9	—
11	31	—	—	—	—	—	100	100	100	19.3	16.1	100	—
12	69	—	—	—	—	—	100	100	100	3.2	3.2	3.2	—
13	47	—	—	—	—	—	100	100	100	59.6	46.8	100	—
14	32	—	—	—	—	—	100	100	100	6.4	6.4	100	—
15	33	—	—	—	—	—	100	100	100	8.5	8.5	100	—
16	17	—	—	—	—	—	100	100	100	3.2	3.2	100	—
17	19	—	—	—	—	—	100	100	100	95.6	92.7	100	—
18	9	—	—	—	—	—	100	100	100	97.9	97.9	100	—
19	12	—	—	—	—	—	100	100	100	2.1	2.1	100	—
20	55	—	—	—	—	—	100	100	100	100	100	100	—

TABLE 5. PERCENTAGE OF EACH PERMANENT TOOTH ERUPTED OR ERUPTING AT EACH AGE, IN ZULUS
(The figures in *italics* indicate the erupting teeth)

LOWER JAW										Females									
Age	Number of Cases	Right						Left											
		M	M	M	P	P	C	I	I	I	C	P	P	M	M				
5	12	—	—	41.7 25.0	—	—	—	16.7 8.3	33.3	33.3	—	—	—	50.0 16.7	—	—			
6	13	—	—	76.9 7.7	—	—	7.7	53.8 15.4	84.6	84.6	—	—	—	76.9 7.7	—	—			
7	22	—	—	100	—	—	—	86.4 4.5	100	100	—	—	—	100	—	—			
8	35	—	—	100	—	—	11.4	94.3 2.9	100	100	20.0	5.7	5.7	100	—	—			
9	32	—	—	100	40.6	50.0	50.0	62.5 6.2	100	100	59.4	2.9	2.9	100	28.1 15.6	—			
10	43	—	—	100	51.2	67.4	67.4	69.8 2.3	100	100	62.8	2.3	2.3	100	18.6 16.3	—			
11	40	—	—	100	85.0	95.0	95.0	97.5 2.5	100	100	100	2.5	2.5	100	65.0 7.5	—			
12	51	—	—	100	98.0	100	100	100	100	100	100	98.0	98.0	100	88.2 2.0	—			
13	41	—	—	100	97.6	100	100	97.6	100	100	100	100	95.1	100	95.1 2.4	—			
14	48	6.2 18.8	—	100	100	100	100	100	100	100	100	100	100	100	100	4.2 20.8			
15	26	19.2 15.4	—	100	100	100	100	100	100	100	100	100	100	100	100	19.2 7.7			
16	32	31.2 18.7	—	100	100	100	100	100	100	100	100	100	100	100	100	28.1 15.6			
17	31	51.6 16.7	—	100	100	100	100	100	100	100	100	100	100	100	100	51.6 6.4			
18	30	46.7 16.7	—	100	100	100	100	100	100	100	100	100	100	100	100	53.3 10.0			
19	11	63.6 18.2	—	100	100	100	100	100	100	100	100	100	100	100	100	54.5			
20	44	95.4 2.3	—	100	100	100	100	100	100	100	100	100	100	100	100	95.4			

TABLE 6. TOTAL PERCENTAGE OF PERMANENT TEETH AT EACH AGE, IN ZULUS
(The total number of 16 teeth in each jaw being equal to 100)

Age	UPPER TEETH				LOWER TEETH			
	Males		Females		Males		Females	
	Erupted, Per Cent.	Erupting, Per Cent.	Erupted, Per Cent.	Erupting, Per Cent.	Erupted, Per Cent.	Erupting, Per Cent.	Erupted, Per Cent.	Erupting, Per Cent.
5	17.9	2.3	5.7	2.6	19.5	6.2	11.9	3.6
6	21.3	1.2	21.6	2.88	28.8	0.6	26.4	3.3
7	32.0	0.7	28.9	2.2	37.1	—	34.6	0.8
8	34.7	3.2	36.4	3.2	39.1	4.6	40.1	1.4
9	44.9	2.8	59.9	1.7	46.7	1.8	60.3	2.9
10	59.9	3.0	66.0	2.1	62.1	3.6	62.3	5.7
11	71.3	2.8	77.8	2.5	71.2	1.6	80.1	1.7
12	82.2	0.6	84.3	0.8	83.5	0.7	85.0	0.5
13	86.1	0.6	87.1	—	86.4	1.0	86.2	0.3
14	87.5	—	87.1	0.2	87.5	0.3	88.1	2.4
15	88.2	0.1	89.4	0.9	88.8	0.3	89.9	1.4
16	87.5	1.1	88.2	2.7	91.1	0.7	91.2	2.1
17	88.8	0.3	90.9	0.8	92.7	3.6	93.9	1.0
18	98.6	0.6	94.1	1.0	97.9	0.6	93.7	1.6
19	100	—	92.6	2.8	100	—	94.8	1.1
20	99.8	—	98.7	0.4	99.4	—	99.4	0.1

The figures in heavy-faced type show the sexual discrepancies, the precocity of girls being well pronounced at the age of nine years.

TABLE 7. BEGINNING AND END OF ERUPTION OF THE PERMANENT TEETH
IN ZULUS

Males

Teeth	Upper				Lower			
	Order of Eruption	Begin	The Ma- jority is Erupt- ing at	End	Order of Eruption	Begin	The Ma- jority is Erupt- ing at	End
Med. Incisors.....	II	before 5?	5- 6	8	II	before 5?	5- 6	6
Lat. Incisors.....	III	5	7- 8	8	III	5	6- 7	8
Canines.....	V	8	10-11	13	IV	8	10-11	13
Ant. Premolars.....	IV	8	10-11	12	V	8	10-11	13
Post. Premolars.....	VI	8	10-11	12	VI	8	10-11	12
First Molars.....	I	before 5?	5- 6	8	I	before 5?	5- 6	8
Second Molars.....	VII	10	11-12	13	VII	9	11-12	14
Third Molar.....	VIII	13	18-20	?	VIII	13	17-19	?

Females

Med. Incisors.....	II	before 5?	6- 7	7	II	before 5?	5- 6	7
Lat. Incisors.....	III	5	7- 8	8	III	5	6- 7	8
Canines.....	V	8	9-11	13	IV	6	9-10	13
Ant. Premolars.....	IV	8	9-10	12	V	8	9-10	12
Post. Premolars.....	VI	8	9-11	12	VI	8	9-11	13
First Molar.....	I	before 5?	6- 7	—	I	before 5?	5- 6	—
Second Molar.....	VII	9	11-12	—	VII	9	11-12	13
Third Molar.....	VIII	12	18-20	?	VIII	12	17-19	?

Thus for instance, figure 32.0 in Table 6, second column, third line, indicates that at the age of seven in boys there were 32 per cent of erupted permanent teeth in the upper jaw, whereas the figure 100 in the same column, last line but one, indicates that males at the age of nineteen had already a full set of teeth, *i.e.*, 16 permanent teeth in the upper jaw.

Table 7 gives the beginning and the end of eruption, the time at which the majority of teeth are erupting, and the order of eruption. The time at which the majority of teeth are erupting is "the time of eruption" in the proper sense, the beginning and the end of eruption being more or less extremes only. This time of eruption is therefore about the same as the "median" of Bean, being the time half way between the beginning of eruption and the end of eruption (Bean, p. 128).

All of these tables can now be considered together, and it may perhaps be best to take each type of tooth separately.

UPPER TEETH

Median Upper Incisors.—Most probably they begin to erupt earlier than the fifth year in some cases, but in boys the main time of eruption is the fifth and sixth years and in girls the seventh year. Girls are somewhat more backward in this particular than boys, but the period of eruption of this tooth appears to be shorter in girls than in boys. At the age of eight in girls all median incisors were through the gums, whereas the boys did not reach 100 per cent before the ninth year. There were hardly any discrepancies between the right and left side in this respect.

Lateral Incisors.—The lateral upper incisors begin to erupt a little later than the median, and the girls are again appreciably more backward than the boys. But the mean time of eruption is the same for both sexes, showing that in this case too dentition in girls once started progresses more rapidly than in boys. At the age of nine years both sexes have the full number. There is also in this case practically no difference between the two sides.

Canines.—The time of beginning of eruption of the upper canines appears to be about the same in both sexes. At the age of eight, however, the number of erupted teeth is greater in girls than in boys, and likewise at the age of eleven years the number of erupted canines is greater in girls than in boys. The limits of the period of eruption for both sexes are practically the same, but from the percentage of erupted

canines at intermediary ages we see that the girls are a little precocious. In both sexes the left canine seems to develop a little more rapidly than the right.

Anterior Upper Premolars.—In both sexes the extremes of the period of eruption are the same, beginning at the age of eight and ending at twelve years. But girls once more are earlier in point of time at which the majority of the teeth are erupted. The median time, as we call it in accordance with Bean, is for this tooth from nine to ten in girls and from ten to eleven in boys. There is practically no difference in the time of eruption of the anterior premolars on the right and left side.

Posterior Premolars.—In a very few individuals, males and females, the posterior upper premolars were seen to begin to erupt at the age of eight years; but the time of greatest intensity is from nine to eleven in girls and from ten to eleven in boys. The percentage of erupted posterior premolars at the age of eleven years is greater in girls than in boys, the former tending again to be a little precocious. In both groups the end is in the twelfth year.

First Molars.—The first upper molars in the Zulu begin to erupt before the age of five years, at least so in the boys, where 75 per cent in the left and 87.5 per cent in the right side were already erupted at the age of five years. The greatest intensity is from the fifth to the sixth year in boys and from the sixth to the seventh year in girls. At the end of seven the eruption was found to be fully terminated in the girls but in some of the boys it was prolonged until the eighth year. Hence, the end is a year earlier in girls than in boys. There is no difference in the time of eruption on the two sides.

Second Molars.—The second upper molars begin to erupt at the age of ten years in boys and a year earlier in girls. The median period, when the majority of these teeth are erupting, lasts two years, from eleven to twelve, in both sexes. At the age of thirteen the eruption of this tooth is terminated in the girls, whereas in boys of that age we still find some individuals without the second upper molar, consequently the boys are one year more backward than the girls. No differences could be noticed as to right and left.

Third Molars.—The upper wisdom teeth begin to appear very early, at the age of twelve years in girls and of thirteen in boys, but they are present in only a few individuals before the fourteenth or fifteenth year. Most of the third molars erupt in both sexes between the eighteenth and twentieth years. As to the end, nearly the full 100

per cent in boys and about 92 per cent of erupted or erupting teeth in girls are present at the age of twenty. It seems that the teeth of the right side erupt somewhat more promptly than those of the left.

LOWER TEETH

Median Incisors.—The lower median incisors, like the upper, begin to erupt in some cases before the age of five years. The maximum intensity of eruption is between the fifth and sixth years in both sexes. At five the percentage of erupted lower incisors is greater than that of the upper, therefore, in general they may be regarded as slightly earlier. The end of eruption is reached soon, the full 100 per cent being already present in boys of seven years, while in girls but few were lacking at that age. All the girls had the median lower incisors at the age of eight.

Lateral Lower Incisors.—These begin to erupt during the fifth year. The percentage of erupted teeth at that age is again greater than in the upper jaw. The girls here also are a little more backward than the boys but the median time is the same for both sexes, and at the age of eight there are but few individuals of either sex without both the lateral lower incisors.

Canines.—The lower canines also erupt earlier than the canines of the upper jaw, as seen from the percentages of erupted teeth at the age of eight years. The girls are somewhat earlier than the boys. At thirteen the eruption is terminated; and at fourteen all individuals of both sexes were found to have the full number of lower canines.

Anterior Premolars.—The anterior lower premolars erupt slightly later than the upper, the percentage of erupted teeth at the age of eight being higher in the upper jaw than in the lower jaw. The median time is from nine to ten in girls and from ten to eleven in boys, the time of greatest intensity in eruption beginning earlier in girls than in boys. The termination of eruption is also earlier in girls than in boys, occurring at twelve and thirteen years respectively.

Posterior Premolars.—There were few instances of erupting posterior lower premolars at eight years; but the majority of teeth were observed to erupt between the ninth and eleventh year in girls and between the tenth and eleventh in boys. This time the end came sooner in boys than in girls; at the age of thirteen the boys had 100 per cent of these teeth, while in the girls there were still some lacking.

First Lower Molars.—At the age of five years, 87.5 per cent of the first lower molars were already erupted, hence it is evident that these

teeth occasionally erupted before that age. They were observed to be slightly more precocious than the upper first molars. Their period of maximum eruption was from the fifth to the sixth year, and proceeded more quickly in girls than in boys. It also ended earlier in girls, for a few instances were found where boys still lacked the first lower molars at the age of eight. On the whole, among the Zulu the first molars in both sexes were the first permanent teeth to erupt.

Second Molars.—In both sexes the second lower molars erupted earlier than the upper. The beginning was at the age of nine years, and the period of greatest intensity of eruption was seen to be between the eleventh and twelfth years. The girls showed a little more precocity than the boys. The end came at the thirteenth year in girls and at the fourteenth in boys.

Third Molars.—The third lower molars were slightly earlier than the upper. The time of the greatest intensity of eruption in both sexes was between the seventeenth and nineteenth years, and the girls were a little ahead of the boys. About 96 per cent of these teeth in both sexes were erupted or erupting at the age of twenty.

We have now considered dentition among the Zulu tooth by tooth. From table 7 it can be seen that the order of eruption is the same for both sexes in each jaw; that the beginning of eruption of permanent teeth is very early; and that girls in general are slightly more precocious in this respect than boys.

The sex discrepancies are even more evident in Table 6. This table gives the total percentage of all permanent teeth erupted or erupting at each age. We have noticed already that with regard to several of the teeth the girls are somewhat precocious; also that the same is true when we regard dentition as a whole. We see that girls at the age of nine have erupted 59.9 per cent of all permanent upper teeth, while boys reach this percentage one year later; and the case is similar with the lower teeth at the same age. From this period of nine years the girls are ahead; but both sexes will have about the same percentage of permanent teeth after puberty, when dentition is complete except for the third molar.

Besides this an interesting feature is seen between the ages of eight and nine years. There is a sudden leap from 36.4 per cent in the eighth to 59.9 per cent in the ninth year in the upper teeth of the girls, and the same in the lower teeth, where the ratio is 40.1 per cent to 60.3 per cent. Without doubt this jump is connected in some way with the development of the body in general.

As to *side*, it was possible to observe 119 groups of discrepancies. Of these groups, in 65 the right side was the more advanced, *i.e.*, 54.6 per cent; in 54 the left side was the more advanced, *i.e.*, 45.4 per cent. Hence, in 9.2 per cent more of the cases the right side was further advanced than the left.

Remarks. Anomalies.—In general the Zulu have a fine set of teeth. The individual teeth are well developed, well differentiated, very seldom discolored, and the cusps are well formed. Additional cusps on the molars (the cusp of Carabelli) are not rare. Crowding of teeth and displacements were met with in a few cases only. Decay of teeth will be considered in a special chapter.

Fairly frequent is the trema (central diastema) in the upper jaw; the writer saw it several times in talking to the people, and found it six times recorded in his notes. The natives know it very well, have a special name for it—*ityako*,—and admire it both in men and in women.

As we have seen, the teeth begin to erupt very early and dentition is completed in a relatively short time; at the age of eighteen several of the individuals examined had all four of the third molars erupted; one boy, 148.9 cm. tall, about thirteen or fourteen years old, already had 32 teeth, though still no hair in the armpit and in the pubic region.

As to *Anomalies*, the following were recorded:

1. *Supernumeraries.*—There was a supernumerary conical tooth behind the upper right permanent median incisor found in three cases: boy, thirteen years old, 129.9 cm. tall; girl, eleven years old, 129.5 cm. tall; and a girl, eleven years old, 139.2 cm. tall.

2. *Congenital Deficiencies.*—The upper left permanent median incisor lacking: girl, eighteen years, 153.9 cm. tall; the upper right permanent lateral incisor lacking: boy, twelve years, 137.0 cm. tall; the upper left permanent lateral incisor small and conical [a supernumerary with impaction of incisor?—Ed.]: girl, sixteen years, 156.9 cm. tall; the lower left permanent lateral incisor lacking: girl, twelve years, 139.9 cm. tall; the upper canines lacking, no space for them, the arch quite symmetrical and the row full, three cases: boy, thirteen years, 141 cm. tall; boy, twelve years, 130.2 cm. tall; girl, thirteen years, 144.9 cm. tall; the lower canine lacking: girl, seventeen years, 161.6 cm. tall; the lower right and left canines with three cusps: boy, nine years, 129 cm. tall; the upper right and left permanent anterior premolar and the lower right and left permanent posterior premolar lacking at full row: girl, nineteen years, 157.7 cm. tall.

3. *Coexistence of Permanent with Temporary Teeth.*—The lower left permanent median incisor and the temporary incisor both present together: two cases: boy, nine years, 123.5 cm. tall, boy, ten years, 130.8 cm. tall; the upper right and left permanent canines and the deciduous canines present together: boy, eleven years, 139.2 cm. tall; the lower left permanent canine and the temporary canine present together: boy, ten years, 130.8 cm. tall; the upper right and left permanent posterior premolars and the temporary posterior molars present together: girl, eleven years, 144.4 cm. tall: the upper right permanent posterior premolar and the temporary molar present together: girl, thirteen years, 149 cm. tall.

It will be seen that the anomalies attending the first and second dentition among the Zulu negroes are not many. Supernumerary teeth behind the upper median incisors have been met with also in a Zulu boy near the Umseneni River in northern Zululand. He had two such teeth behind the upper median incisors in the palate. They troubled him somewhat, for he asked to have them pulled. A plaster cast of the abnormality was made, and both teeth could be drawn easily. However, most of the abnormalities met with were defects of individual teeth which in some cases at least may have been due to impaction, and delayed shedding of individual temporaries.

III

TIME AND ORDER OF ERUPTION OF THE PERMANENT TEETH IN WHITES

As already mentioned, the condition of teeth in Whites in this connection has been studied in children and adolescents at Prague.¹ The investigations were carried out in quite the same manner as in South Africa, hence the data gathered form a good basis of comparison. The subjects were boys between the ages of six and nineteen years from three different schools: Normal school, College, and School for Apprentices in different trades. The age was taken from the school records and quoted only in full years. The age groups of eighteen and nineteen years are small, but this is of no importance, the eruption of permanent teeth at that time being finished except for the third molar. To gather reliable statistics for the wisdom teeth in Whites would require the examination of a large number of individuals at ages ranging from twenty to thirty years, for in our race the time of eruption of the third molar differs much in individuals and covers a

¹ This part of the investigations has been published with some more details by the writer in the *Čech Medical Review*, 1916. (*Lékařské Rozhledy*, Praha.)

period of nearly twenty years. The boys were examined at the Paedologic Institute of the City of Prague¹ by Prof. Matiegka, or the writer.

TEETH OF WHITE BOYS (BOHEMIA).

Subjects:

Age	Normal School	School for Apprentices	College	
6	21	.	.	21
7	25	.	.	25
8	24	.	.	24
9	30	.	.	30
10	28	.	.	28
11	29	.	24	53
12	44	.	22	66
13	51	.	33	84
14	12	32	21	65
15	1	92	20	113
16	.	90	14	104
17	.	49	9	58
18	.	9	4	13
19	.	1	9	10
Total number of subjects				694

The following tables, 8 and 9, contain the number of cases at each age, and the per cent of erupted and erupting teeth for each type of tooth, for each jaw, and for right and left side separately, in the same manner as in Tables 2, 3, 4, and 5.

With these tables at hand we are able to consider the whole dentition for each tooth and each jaw separately. The time at which the majority of teeth are erupting is again "the time of eruption" in the proper sense, whereas the entire time covered by the eruption of each type of tooth is given in Table 10.

UPPER TEETH

Median Upper Incisors.—It is almost certain that these teeth begin to erupt at the fifth year, for among our cases we found at the age of six years 14.3 per cent of fully erupted and 9.5 per cent of erupting median incisors on the left side, and 4.8 per cent of erupted and 4.8 per cent of erupting teeth on the right side. The main period of eruption for these teeth is the *seventh* year. At the age of eight the eruption is nearing its end, and in the ninth year we always found the full number. The observation that the left side developed more rapidly than the right corresponds with Bean's results (p. 129). It

¹ Thanks are due in this connection, to M. J. Dolenský, Curator at the Institute, or facilitating the work.

TABLE 9. PERCENTAGE OF EACH PERMANENT TOOTH ERUPTED OR ERUPTING AT EACH AGE, IN WHITE BOYS AT PRAGUE
(The figures in *italics* indicate the erupting teeth)

was well marked in the children of Prague, the left side having three times as many teeth at a certain period as the right side.

Lateral Upper Incisors.—The beginning of eruption is in the seventh year. The left side is again ahead, agreeing once more with Bean's results. The main time of eruption is from the eighth to the ninth year, in some cases extending to the tenth or even eleventh year, the latter being the extreme limit.

Canines.—The upper canines begin to erupt at the ninth year. At ten about one-fourth have already erupted. The main period of eruption is between the tenth and the eleventh year. In individual cases eruption is not completed until the sixteenth year; but on the whole it ends at the fifteenth year, which again agrees with Bean's observation.

Anterior Upper Premolars.—While in a few cases these teeth were observed at seven years of age, the general beginning of their eruption is from the tenth to the eleventh year. The end of eruption comes at the age of fourteen. The left side is just a little ahead of the right. The entire period of eruption covers eight years, as in the case of the upper canines; in the case of the median incisor and the first molar the entire period does not cover more than four years.

Posterior Upper Premolars.—The beginning of eruption was observed at the eighth year. The main period of eruption extends from the tenth to the twelfth years. The entire period of eruption covers eight years, the end coming at the age of fifteen. The left side is again slightly ahead of the right.

First Upper Molar.—In Prague children the first molars begin to erupt at the age of five years, and were found in 30 per cent of the cases at the age of six. Possibly in some instances eruption begins even before the fifth year. The main time of eruption is from the sixth to the seventh year, the end comes during the eighth. There were no discrepancies between the two sides. The entire time of eruption of these teeth is rather short, only four years.

Second Upper Molars.—These teeth were found in a few children during their tenth year, but in general they begin to erupt at the eleventh year, the main period of eruption being between the twelfth and the fourteenth years. The end comes during the seventeenth year, the entire period of eruption covering eight years, or double that of the first molars.

Third Upper Molars.—As already stated, the number of cases in the higher ages is insufficient to permit definite conclusions as to the

eruption of these teeth. However, none were observed to begin to erupt before the seventeenth year. In the main the beginning of eruption was about the nineteenth year, which agrees with the results obtained by other investigators among White adolescents (as for instance those of Magitot, Zuckerkandl, Quain, etc., according to Herpin's review). Bean states that in American and in German-American boys the third upper molar never appears before the eighteenth year (p. 132); while Daffner gives the average time at which these teeth begin to erupt in German children of his observation as twenty-one and a half years. In a few instances our school boys are more precocious than American boys, and in general more precocious in this respect than Daffner's Germans.

LOWER TEETH

Median Incisors.—At the age of six years 50 per cent of the lower median incisors were already through the gums, there is no doubt, therefore, that eruption begins in the fifth and in some instances possibly even before the fifth year. The main period of eruption lasts only two years, from the sixth to the seventh year; at the beginning of the eighth year the full 100 per cent were already found present. Hence the lower median incisor is by a year more precocious than the upper one, and the right lower tooth is somewhat more precocious than the left, a result which quite agrees with Bean's statements. The whole period of eruption lasts three years, a year less than for the median incisors of the upper jaw.

Lateral Lower Incisors.—Begin to erupt in the sixth year, in some cases probably even earlier. The main time of eruption is from the seventh to the eighth year, and proceeds until the tenth year. We have always found the full number at the beginning of the eleventh year. Like the median incisors, these teeth also erupt a year sooner than the corresponding ones. The entire period of eruption lasts five years, a year less than in the upper jaw.

Canines.—The lower canines, too, were found to be more precocious than the upper. They begin to erupt at the eighth year, and the main time of eruption extends from the tenth to the eleventh year. The entire period lasts seven years, or to the end of the fourteenth year. Bean also places the beginning of eruption of the lower canines a year earlier than that of the upper.

Anterior Lower Premolars.—These teeth, contrary to the incisors and canines, are a year later in their eruption than those of the upper

jaw. The main period of eruption extends from the tenth to the twelfth year, but in some individuals the process lasts until the fifteenth year, the whole period covering approximately eight years. The two sides showed no discrepancies. All this agrees with Bean's observations on American Whites.

Posterior Lower Premolars.—On the whole, conditions found in connection with these teeth were similar to those in the upper jaw, the teeth of the latter being a little more precocious. The same was noticed by Bean. The entire period of eruption in both jaws lasts eight years, but the main time is between the eleventh and twelfth year. There is no appreciable difference between the two sides.

First Lower Molars.—These are the earliest teeth of the permanent dentition. No doubt their eruption frequently begins in or even before the fifth year, for we find 70 per cent of these teeth present in the sixth year. The entire period is very short, covering only three years, the end being at seven. The whole time lasts a year less than in the upper jaw, ending a year earlier. No particular difference was noted between the right and left sides.

Second Lower Molars.—The beginning of eruption is just a little earlier than in the corresponding teeth of the upper jaw. Eruption proceeds very slowly, so that it is difficult to define the time of greatest intensity. The main period lasts from the eleventh to the fourteenth year. After fourteen eruption proceeds very slowly and ends at seventeen. The entire period lasts, therefore, as in the upper jaw, about eight years. The right side is a little more precocious than the left.

Third Lower Molars.—These teeth begin to erupt two years earlier than the upper ones, and the right side is more precocious than the left. They begin to erupt during the fifteenth year, the main period of eruption probably being the eighteenth year. According to Bean, the lower third molars develop sooner than the upper, but the difference in his subjects was slight.

GENERAL REMARKS ON DENTITION IN WHITES

The preceding statements are summarized in the following table (10).

The figures show plainly that in the boys of Prague the beginning of eruption in the lower jaw is more precocious than in the upper, the main period of eruption is shorter, and the end of eruption comes earlier. On the whole it may be said that *the earlier the eruption of a tooth begins the shorter will be the main period of its eruption.*

TABLE 10. BEGINNING AND END OF ERUPTION OF PERMANENT TEETH IN WHITE BOYS OF PRAGUE

Males

Teeth	Upper				Lower			
	Order of Eruption	Begin	The Majority is Erupting	End	Order of Eruption	Begin	The Majority is Erupting	End
Med. Incisors.....	II	5	7- 8	8	II	5	6- 7	7
Lat. Incisors.....	III	7	8- 9	11	III	before 6?	8	10
Canines.....	VI	9	11-12	15	IV	8	10-11	14
Ant. Premolars.....	IV	7	10-11	14	V	8	10-12	15
Post. Premolars.....	V	8	10-12	15	VI	8	11-12	15
First Molars.....	I	5	6- 7	8	I	before 5?	5- 6	7
Second Molars.....	VII	10	12-14	17	VII	10	11-13	17
Third Molars.....	VIII	17	19-?	?	VIII	15	18-?	?

To get a correct idea of how dentition is proceeding at a given age we may consider table 11, which gives the total percentages.

TABLE 11. TOTAL PERCENTAGE OF PERMANENT TEETH AT EACH AGE, IN THE WHITE BOYS OF PRAGUE

(The total number of 16 teeth in each jaw being equal to 100)

Males

Age	Number of Cases	Upper Jaw		Lower Jaw	
		Erupted	Erupting	Erupted	Erupting
6	21	6.2	2.9	16.6	2.9
7	25	15.2	5.2	25.0	2.0
8	24	29.4	7.5	32.8	5.4
9	30	36.2	4.5	40.2	3.5
10	28	49.7	5.3	50.4	6.4
11	53	57.4	6.6	61.1	6.9
12	66	72.5	5.5	78.2	3.1
13	84	79.3	2.9	80.6	2.2
14	65	83.4	1.4	83.2	1.5
15	113	86.1	0.5	85.9	0.2
16	104	86.5	--	86.4	0.5
17	58	86.7	0.4	86.6	0.7
18	13	88.4	1.4	90.8	1.4
19	10	86.2	1.8	88.7	1.2

The number of permanent teeth in each jaw is here presented in percentages of the full number, 16 teeth equaling 100 per cent. According to this an individual with all 16 teeth in one jaw has 100 per cent of the permanent dentition in the respective jaw, while for instance, a person without the third molars in a jaw has in this jaw only 14 teeth, or 87.5 per cent of the full dentition. One tooth in each jaw is equal to 6.25 per cent of the full dentition in that jaw.

Table 11 shows plainly that in the youth of Prague the lower jaw is ahead of the upper one; further, that the progress of dentition is not symmetrical, the greatest difference in the increase being between the eleventh and twelfth years, *i. e.*, at the time when the beginnings of puberty in our country are just becoming noticeable. The percentage of erupting teeth (Table 1, columns 4 and 6) are high in these years, a sign that dentition at this time is proceeding with great speed. With the seventeenth and eighteenth years dentition is completed, except for the third molar, whose appearance is quite irregular.

A few precocious cases of eruption may be mentioned in this place. A college boy, twelve years one month old, had already 28 teeth, although the two second upper molars had not yet fully erupted. Another boy, twelve years five months old, had 28 fully erupted teeth, and both lower third molars in the process of eruption. In his textbook on Dentistry, Nesel records a case of 28 teeth in a boy of twelve, and a full set of 32 teeth in a boy of seventeen.

In Negroes we noticed some differences in eruption on the right and left sides (p. 363); we find similar discrepancies in our Whites. We had 86 groups of discrepancies. In 45 (52.3 per cent) the right side was the more advanced, and in 41 (47.7 per cent) the left side was the more precocious. Thus the right side was more advanced in 4.6 per cent more cases than the left.

Taken as a whole dentition in the boys of Prague shows no marked peculiarities in comparison with other Whites.

III

RACIAL COMPARISONS

The literature furnishes numerous data on dentition among Whites, but it would be impracticable to draw on all these in the limits of the present paper. So far as Whites are concerned, the most convenient to use for comparison will be Bean's investigations on American and German-American children from Ann Arbor, Michigan; Roese's work on eruption of permanent teeth of boys from different countries in Europe (Sweden, The Netherlands, Switzerland, Belgium, Germany and Denmark); and our own study of Čech boys from Prague. For the yellow, brown and black races we have Hrdlička's observations on North American Indians, Bean's publication on Philippino children from schools in Manila, and our own records of Zulu boys and girls from South Africa.

For a better survey of the beginning and end of eruption of teeth

in different races Table 12 is placed here. From it we see at once that white children from the different countries show no great differences in these respects—still it is apparent that with the Čech boys the eruption of permanent teeth is a little more precocious than in the American children. The American and German-American girls are ahead of the boys, as is the case among all groups. In the colored

TABLE 12. BEGINNING AND END OF ERUPTION IN DIFFERENT RACES

Teeth	Ameri- can Boys, Bean	Ameri- can Girls, Bean	German- Ameri- can Boys, Bean	German- Ameri- can Girls, Bean	Čech Boys Prague, Ma- tiegka & Suk	Diff. Europ. Boys, Roese	Philippino Boys, Bean	Philippino Girls, Bean	Zulu Boys, Suk	Zulu Girls, Suk
1	2	3	4	5	6	7	8	9	10	11
<i>Upper:</i>										
Median incisor . .	7-9	6-9	6-11	7-10	5-8	5½-11½	b. 5-9	b. 5-9	b. 5-8	b. 5-7
Lat. incisor	7-11	7-12	7-11	7-11	7-11	6-?	b. 5-11	b. 5-9	5-8	5-8
Canine	10-14	9-15	10-14	8-15	9-16	7½-15	b. 5-11	5-13	8-13	8-13
Anter. premolar . .	8-16	8-13	8-14	8-13	7-14	6½-14½	5-14	10-13	8-12	8-12
Poster premolar . .	9-16	8-14	9-14	8-14	8-15	6½-15	5-15	10-13	8-12	8-12
First molar	6-9	6-8	6-9	5-7	5-8	5-9½	b. 5-10	b. 5-9	b. 5-8	b. 5-7
Second molar . . .	12-16	10-15	11-16	11-16	10-17	9-15	5-14	10-15	10-13	9-12
Third molar		16-?			17-?		13-?	12-?	13-?	12-?
<i>Lower:</i>										
Med. incisor	6-8	5-8	6-11	5-9	5-7	5-10	5-9	b. 5-9	b. 5-6	b. 5-7
Lat. incisor	7-10	6-9	7-10	7-10	6-10	6-12	5-10	b. 5-9	5-8	5-8
Canine	9-13	8-13	10-14	8-12	8-14	7-15	5-11	b. 5-9	8-13	6-13
Anter. premolar . .	9-14	9-14	10-14	8-14	8-15	7-14½	5-14	5-13	8-13	8-12
Poster premolar . .	8-16	9-15	10-14	9-15	8-15	7-15	5-15	10-13	8-12	8-13
First molar	6-8	5-8	6-7	5-8	5-7	5-10	b. 5-12	b. 5-9	b. 5-8	b. 5-6
Second molar . . .	11-17	10-16	10-16	10-14	10-17	9-15	5-14	5-13	9-14	9-13
Third molar		16-?		14-?	15-?		13-?	14-?	13-?	12-?

races, the Filipinos and Zulus, we note that eruption begins earlier and is completed sooner. Most of the boys and girls at the ages of fourteen and fifteen years in these races have 28 fully erupted teeth, while in white children we do not find this number (*i.e.*, the full set apart from the third molars) until the seventeenth and eighteenth years. In Negroes we find the period of greatest intensity of eruption to fall between the ages of nine and ten in boys, and between the ages of eight and nine in girls (Table 6). We find the same period and with similar sex difference in our children two years later (Table 10, 11). There is no doubt that these conditions are closely connected with the general development of the body, and in particular with the earlier reaching of puberty in the Negroes.

Table 13 which follows affords the best basis for comparison, giving us the time of eruption in the proper sense, *i.e.*, the time when the majority of teeth are erupting. Some writers have attached too much

importance to finding an exact date for eruption, *i.e.*, getting a proper mean number for each tooth. Roese did this with his material. By means of a very complicated calculation he determined the average time of eruption for each tooth. He says, for instance, that the upper

TABLE 13. "THE TIME OF ERUPTION," OR THE PERIOD OF THE MOST RAPID ERUPTION OF THE PERMANENT TEETH IN DIFFERENT RACES

Teeth	American Boys, Bean	German- American Boys, Bean	American Girls, Bean	German- American Girls, Bean	Čech Boys, Prague, Matiegka & Suk	Phil- lippo Boys, Bean	Zulu Boys, Suk	Zulu Girls, Suk
<i>Upper:</i>								
Med. incisor....	7-8	7-8	7-8	7-8	7-8	.	5-6	6-7
Lat. incisor....	8-10	8-9	8-9	7-9	8-9	.	7-8	7-8
Canine.....	11-12	11-12	10-11	10-12	11-12	5-9	10-11	9-11
Ant. premolar..	10-11	10-12	9-11	9-11	10-11	5-10	10-11	9-10
Post. premolar..	10-12	10-12	10-11	10-11	10-12	7-11	10-11	9-11
First molar....	6-7	6-7	5-6	6-7	6-7	.	5-6	6-7
Second molar...	12-14	11-14	12-13	12-13	12-14	10-11	11-12	11-12
Third molar....	.	.	.	.	19-?	17-20	18-20	18-20
<i>Lower:</i>								
Med. incisor....	6-7	6-7	5-6	6-7	6-7	.	5-6	5-6
Lat. incisor....	7-9	7-9	7-8	7-8	7-8	.	6-7	6-7
Canine.....	11-12	11-12	9-11	10-11	10-11	5-9	10-11	9-10
Ant. premolar..	10-12	11-12	9-11	10-11	10-12	10-11	10-11	9-10
Post. premolar..	11-12	10-13	10-11	11-12	11-12	10-11	10-11	9-11
First molar....	6-7	6-7	5-6	6-7	5-6	.	5-6	5-6
Second molar...	11-14	11-14	10-12	11-12	11-14	10-11	11-12	11-12
Third molar....	.	.	.	.	18-?	17-18	17-19	17-19

posterior premolar has an average time of eruption of eleven years and four months (his Table 14, p. 564), while in our table we find that the "time of eruption" for this tooth is between the ages of ten and twelve (our Table 13), and Bean has it the same. The writer does not doubt that Roese's figure of eleven years and four months may be mathematically correct, but it is of very little use. The eruption of a tooth is a comparatively slow physiological process always covering a long period, hence it is of little use to express the time by a "point"; it is much better expressed by a "line," like a Gaussian statistical curve. Thus if we say that the upper posterior premolar erupts between the tenth and twelfth years we shall be correct in about 85 per cent of the cases (Table 8). The eruption would give us a very flat Gaussian curve and not a sharp-pointed one.

From Table 13 we see that the colored races, Philippinos and Zulus, are much more precocious than the white children. The native white Americans are a little more precocious than the German-Americans, and the eruption of permanent teeth in the Prague boys

advances somewhat more rapidly than in either of the groups just mentioned. In Americans, German-Americans, and Čechs we find the third molar still lacking in most cases at the age of eighteen, whereas in Philipinos and Zulus the eruption of this tooth begins at the age of thirteen, and most of the boys and girls already have their full set of 32 teeth at the age of twenty.

Chérot (quoted after Bean), who published new data on dentition in French children, shows that the beginning and end of tooth eruption is somewhat more precocious in French than in American children.

Hrdlička's data on full blood Indians (Pima and Apache) need a separate consideration. His work was among Indians in whom the keeping of age records was of very recent date. In consequence, out

TABLE 14. ERUPTION OF TEETH IN INDIANS (PIMA AND APACHE, HRDLIČKA)
(In 124 children of known age)

TEMPORARY TEETH

	Earliest Age at which One or Both were Seen Erupting or Erupted			Oldest Child in Whom One or Both were Still Lacking		
	Year	Monthly	Day	Year	Monthly	Day
<i>Upper:</i>						
Median incisor.....	—	7	17	1	—	18
Lateral incisor.....	—	7	20	1	—	15
Canines.....	1	5	14	1	11	—
Anterior premolar..	1	4	25	1	5	14
Posterior premolar .	2	2	9	2	2	9
<i>Lower:</i>						
Median incisor.....	—	2	15	—	6	—
Lateral incisor . . .	—	8	16	1	6	2
Canine.....	1	5	14	2	—	—
Anterior premolar..	1	4	25	1	6	2
Posterior premolar .	1	10	—	2	2	—

PERMANENT TEETH

<i>Upper:</i>						
Median incisor.....	7	4	7	7	9	13
Lateral incisor.....	8	0	0	10	6	11
Canine.....	10	8	0	—	—	—
Anterior premolar..	10	6	11	—	—	—
Posterior premolar .	10	6	11	—	—	—
First molar.....	4	9	7	5	10	0
Second molar.....	10	8	—	—	—	—
<i>Lower:</i>						
Median incisor.....	6	9	20	8	2	0
Lateral incisor.....	7	9	15	10	6	11
Canine.....	10	6	11	—	—	—
Anterior premolar..	10	6	11	—	—	—
Posterior premolar .	12	1	8	—	—	—
First molar.....	4	9	7	5	10	0
Second molar.....	10	8	—	—	—	—

of the large number of children and adolescents he examined, the exact age could be ascertained in only 124 subjects, ranging from three to thirteen years of age. The data obtained on these children, which give us for the first time information as to the temporary teeth in a colored race, are summarized in the foregoing table.

Notwithstanding the difficulties of proper comparison, the preceding table is quite instructive. With one or two exceptions there appear to be no great discrepancies between the whites and the Indians. The eruption of the first permanent molars seems to occur a little earlier in the whites, but it must be remembered that the number of the Indian children available for comparison was small. The first molars, incisors and bicuspid appear at nearly the same statures in both races. The canines erupt possibly a little earlier in the Indians, and the second molars are decidedly earlier in both of the tribes than in white children.

The conclusions drawn by Hrdlička from his total Indian series (826 children and adolescents) were the following:

"Temporary teeth: All the teeth of the first dentition appear in the same order in the Indian child as in the white.

"All the incisors erupt on the average at about the same age in the two races.

"The appearance of the anterior premolars and the canines seems to be somewhat belated in the Indian.

"The eruption of the posterior premolars and the completion of the first dentition are accomplished earlier in the Indian than in the Caucasian.

"Permanent teeth: The incisors appear in the Indians at about the same age as in whites, and the same statement is probably true with regard to the permanent first molars and both bicuspid.

"The canines seem to appear somewhat earlier in the Indians than in the whites.

"The second molars erupt decidedly earlier in the Indians than in white children."

The third molars appear also to erupt a little earlier in the Indians, so that the whole dentition is on the average completed sooner than in civilized whites.

Retardation and non-appearance of the last molars occur also among the Indians, but are decidedly less frequent than among the American whites.

As to sex, there appears to be a little advantage as to promptness with the females.

In order to further facilitate comparison with Hrdlička's data, Bean as well as the writer calculated additionally the ratio dentition-stature in dentition-age. The results, which of course have no claim to as great accuracy as would those based on ages accurately determined, follow:

DENTITION OF PERMANENT TEETH IN FULL-BLOOD NORTH AMERICAN INDIANS
(APACHE AND PIMA—HRDLIČKA)

Teeth	Beginning and End of Dentition (Stated in Years and Tenths of a Year)
Median incisors.....	6.2— 8.5
Lateral incisors.....	7.7—10.00
Canines.....	9.0—12.2
Anterior premolars.....	7.9—13.0
Posterior premolars.....	8.7—14.0
First molars.....	4.9— 7.0
Second molars.....	10.0—13.0
Third molars.....	17.0—?

It is evident that there are no great differences in eruption of teeth between the North American Indians of the tribes examined (both of Arizona) and the Whites. Nevertheless the eruption of the first molar seems somewhat more precocious in these Indians than in white boys. Incisors and premolars appear about the same time, and the canines too do not show any considerable difference though earlier in the Indians. The second molar, however, appears decidedly sooner in the Indians, and the eruption of the third molar also appears to be somewhat earlier. Dentition in Indian girls develops also perceptibly sooner than in Indian boys.

On the whole, the available racial comparisons indicate that, so far as the permanent teeth are concerned, their eruption in the Whites is in general slower than it is in the more primitive colored races; and the differences between the Negroes and the Whites, and also those between the Philippino and White children are more marked than those between the Whites and Indian, so far as the latter have been studied in this respect. These interesting results naturally raise the question as to whether the developmental stage as a whole is not already longer among the civilized Whites than it is among primitive peoples.

DECAY OF PERMANENT TEETH IN WHITES AND NEGROES

Decay of permanent teeth in Whites has been studied by various observers, but not so with the colored races. Only one larger investigation along this line—Bean's studies on Philipinos—is known to the writer; but Bean published only his conclusions. They are as follows:

"The temporary teeth of the Americans are worse than those of the Filipinos, which are worse than those of the Germans. The permanent teeth of the Americans are worse than those of the Germans, which are worse than those of the Filipinos. The girls have worse teeth than the boys in all the groups."¹

"The average number of bad permanent teeth at 16 years is as follows, and this is a fair relative ratio of the extent of decay in the groups at all ages:²

American girls, 7.00 %	American boys, 5.00 %
German girls, 4.27 %	German boys, 3.67 %
Filipino girls, 2.74 %	Filipino boys, 2.16 %

Hrdlička's observations on decay of the teeth among the Indians show that decay is much less frequent than in the Whites, although its frequency varies somewhat according to tribes. The least decay of perhaps all the existing races, according to this observer (personal information), is to be found among the Eskimo.

A detailed comparison of tooth decay must be limited to Whites and Zulus. In this case again the Whites are for the most part school and high school pupils of Prague.

Teeth classed as decayed were those which showed any signs of decay, whether active, corrected, or removed. The data therefore include all filled and extracted teeth; Hutchinson's teeth, and teeth with notches caused by rachitis have not been counted as decayed. The investigation was made with care, but it is possible that a few teeth with a very small area of decay on the contact side have been overlooked, hence the percentage of caries might be slightly greater but not less.

Tables 15 and 16 show us how many teeth of each type were decayed at the different ages, and how decay increased with age. We notice in these tables, as well as in the following ones, the enormous difference

¹ "Eruption and Decay of the Permanent Teeth," *Anat. Rec.*, 1914, VIII, No. 5, 299-302.

² "The Permanent Teeth, with Special Reference to American Children," *Proc. XIX Inter. Cong. Am.*, Wash., 1917, 711-615.

TABLE 15. PERCENTAGE OF DECAYED PERMANENT TEETH IN PRAGUE BOYS
UPPER JAW

Age	Med. Incisor	Lat. Incisor	Canine	Anter. Premolar	Poster. Premolar	1st Molar	2d Molar
6	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—
8	—	—	—	—	—	10.4	—
9	—	—	—	—	—	18.3	—
10	—	—	—	—	—	23.2	—
11	—	1.9	3.3	1.2	3.2	31.1	—
12	1.5	6.1	0.9	1.6	0.9	32.6	1.3
13	3.0	4.7	1.3	5.5	3.2	41.1	0.8
14	2.3	4.6	0.8	6.2	3.2	45.4	6.0
15	3.1	6.1	1.7	4.8	9.9	49.5	1.8
16	5.3	7.2	0.5	10.6	12.0	43.3	6.2
17	10.3	6.0	0.9	9.5	10.3	56.9	4.5
18	—	—	—	11.5	3.8	15.4	7.7
19	20.0	20.0	10.0	30.0	25.0	55.0	15.0

LOWER JAW

6	—	—	—	—	—	—	—
7	—	—	—	—	—	4.3	—
8	—	—	—	—	—	16.7	—
9	—	—	—	—	—	33.3	—
10	—	—	—	—	—	46.4	—
11	—	—	—	—	1.7	48.1	—
12	—	—	—	1.6	3.7	62.1	0.9
13	—	—	—	2.5	6.3	66.1	3.4
14	1	1.5	—	0.8	5.1	61.5	10.3
15	—	0.9	—	1.7	6.7	62.7	12.7
16	—	—	0.9	1.9	6.7	61.5	7.8
17	1.7	1.7	0.8	2.4	8.6	64.7	20.
18	—	—	—	—	3.8	76.9	26.9
19	—	—	—	—	5.0	60.0	38.9

in this respect between Whites and Zulus, and that both as to number of decayed teeth and the number of individuals with decayed teeth.

In the Prague children decay of the permanent teeth begins at the age of about seven, the first lower molar generally decaying first, and in many cases being the only decayed tooth in the whole set. The first upper molar follows next. In Zulu children, decay also begins approximately at the age of seven years, but the first tooth to decay is the first upper molar. Zulu girls are more precocious in this respect than Zulu boys, where decay was not observed before the tenth year.

Teeth usually appear in couples, *i.e.*, the two corresponding teeth in each jaw erupt almost synchronously; but we have noticed that dentition developed sooner in the right side in about 9 per cent of the Negroes and 4.5 per cent of the Whites. The teeth decay in a similar

TABLE 16. PERCENTAGE OF DECAYED PERMANENT TEETH IN THE ZULUS

UPPER JAW						<i>Males</i>		
Age	Med. Incisor	Lat. Incisor	Canine	Anter. Premolar	Poster. Premolar	1st Molar	2d Molar	3d Molar
10	—	—	—	1.6	—	—	—	—
12	—	—	—	0.7	—	0.7	—	—
13	—	—	—	—	—	1.1	—	—
14	1.6	1.6	—	—	—	—	—	—
16	—	2.9	—	—	—	—	—	—
20	—	—	—	—	—	7.2	7.2	4.6

UPPER JAW						<i>Females</i>		
7	—	—	—	—	—	2.3	—	—
9	—	—	—	—	—	1.6	—	—
10	—	—	—	—	—	1.2	—	—
11	—	1.2	—	—	—	—	—	—
14	—	—	—	—	—	1.0	—	—
16	1.6	4.7	3.1	—	1.6	1.6	1.6	—
17	3.2	4.8	—	1.6	3.2	8.1	—	—
18	—	—	—	1.7	1.7	1.7	6.7	2.7
19	—	4.5	—	4.5	4.5	4.5	4.5	7.1
20	2.3	1.1	—	—	1.1	10.2	5.7	2.4

LOWER JAW						<i>Males</i>		
10	—	—	—	—	7.0	—	—	—
12	—	—	—	—	0.8	2.2	—	—
13	—	—	—	—	—	1.1	—	—
14	—	—	—	1.6	1.6	6.2	3.1	—
16	—	—	—	—	—	—	2.9	—
17	—	—	—	—	—	2.6	—	—
18	—	—	—	—	5.6	5.6	—	—
20	—	—	—	—	—	7.2	10.9	10.5

LOWER JAW						<i>Females</i>		
11	—	—	—	—	1.4	3.7	—	—
12	—	—	—	—	—	2.9	—	—
13	—	—	—	—	—	4.9	—	—
14	—	—	—	—	1.0	5.2	2.1	—
15	—	—	—	—	—	3.8	—	—
16	—	—	—	1.6	3.1	17.2	6.2	3.3
17	—	—	—	—	1.6	4.8	8.1	—
18	—	—	—	—	3.3	11.7	6.7	—
19	—	—	—	—	4.5	9.1	22.7	—
20	—	—	—	1.1	—	9.1	6.8	5.9

manner, the permanent teeth decay mostly in couples. Expressed in figures, this feature is very striking. In the Prague children the total number of decayed teeth was 1,764. Out of this number 546 in 152 individuals were single decayed teeth (not in couples), while 1,218 decayed teeth in couples were found in 364 individuals. Table 17 makes this plain.

TABLE 17. SHOWING THE BILATERAL DECAYING OF PERMANENT TEETH
Number of individuals with unilateral and bilateral decay (Prague boys)

Age	Number of Couples of Decayed Teeth								
	0	1	2	3	4	5	6	7	8
Years:					individuals:				
19	3	1	3	.	.	.	.	.	2
18	1	6	4						
17	14	24	9	6	2	1			
16	31	30	18	7	1	2	1		
15	33	31	27	6	2	.	1		
14	19	19	11	5	2				
13	14	36	16	4	.	1			
12	14	18	13	3	1				
11	8	21	5	2					
10	9	8	2						
9	3	4	5						
8	3	1	2						
7	.	1	.						

The first column of the above table gives the age of the children examined, the second column "O" gives the number of individuals with single decayed teeth, and to other columns give the number of individuals with one, two, or more bilateral couples of decayed teeth (as for instance the right and left first lower molar, etc.). The correlation is plain: the number of decayed couples is gradually increasing and the number of individuals with decayed couples is augmenting.

Out of the entire number of 1,764 decayed teeth in the Prague children there were:

Singles:

Single decayed teeth on the right side..... 256

Single decayed teeth on the left side..... 290

Couples:

200 individuals with one couple showing decay 400

115 " " two couples " 460

33 " " three " " " 198

8 " " four " " " 64

4 " " five " " " 40

2 " " six " " " 24

2 " " eight " " " 32

The number of decayed teeth in each individual in Whites and Zulus is shown in the abstracts on next page.

This table is plain; the figures show us once more the great difference in respect to decay between the Whites and the Negroes. Among the Negroes we have but few individuals with four or more decayed

TABLE 18. DECAY OF PERMANENT TEETH IN WHITES AND ZULUS
Upper and Lower Jaw Whites (Prague)—Males

Age	Number of Cases	Individuals with															Total
		1	2	3	4	5	6	7	8	9	10	11	12	13	16		
		Decayed Teeth															
6	21																1
7	25		1														6
8	24	3	1		2												12
9	30	2	5	1	4												19
10	28	6	8	3	2												36
11	53	9	14	4	5	1	3										49
12	66	11	11	6	16	1	2	1	1								71
13	84	8	24	13	13	7	2	2	1				1				56
14	65	13	15	3	11	4	4	1	4		1						100
15	113	18	22	11	20	11	10	1	3	2		1			1		90
16	104	12	26	14	14	10	3	3	2	1	1	1			2	1	56
17	58	7	9	14	7	5	4	2	4	2	2						11
18	13		5	2	1		3										9
19	10	2		1	3		1									2	
Totals . . .	694	91	141	72	98	39	32	10	15	5	4	2	1	3	3		516

Zulu

Males

5	8																	
6	29																	
7	16																	
8	34																	
9	31																	
10	47		2															2
11	31																	
12	69	1	1	1														3
13	47	2																2
14	32	3	1			1												5
15	33																	
16	17	2																2
17	9	1																1
18	9	2																2
19	12																	
20	55	3	5		2	1			1	2								14
Totals . . .	489	14	9	1	2	2			1	2								31

Zulu

Females

5	12																	
6	13																	
7	22	1																1
8	35																	
9	32	1																1
10	43	1																1
11	40	3	1															4
12	51	3																3
13	41	2	1															3
14	48	4	1	1														6
15	26	2																2
16	32	2	2	2				1		1								8
17	31	9	2	1			1											13
18	30	4	3	2		1												10
19	11	2	1	2		1												6
20	44	8	3	2	3				1									17
Totals . . .	511	42	14	10	4	1	1	1	1	1								75

teeth, but among the Whites we find more than 200 individuals with four or more, some having as many as sixteen decayed teeth. Besides this a decided sex difference is indicated: decay is more frequently met with in Zulu girls than in the boys, a fact which is also well known in Whites.

The frequency of decay in the different types of teeth is as follows:

TABLE 19. PERMANENT TEETH ACCORDING TO THEIR INVOLVEMENT BY DECAY AMONG CHILDREN OF PRAGUE AND THE ZULU

Tooth	Jaw	School Chil- dren Prague; Males	Zulu Males		Zulu Females	Tooth	Jaw	School Chil- dren Prague; Males	Zulu Males		Zulu Females
		Age: 6-19	Age: 5-20 and More					Age: 6-19	Age: 5-20 and More		
			Per Cent.	Per Cent.					Per Cent.	Per Cent.	
First molar	lower	42.9	22.8	31.8		Second molar	upper	1.9	10.1	7.3	
First molar	upper	29.2	12.7	13.9		Anter. premolar	lower	1.0	1.3	1.3	
Second molar	lower	5.3	19.0	17.2		Canine	upper	0.8	—	1.3	
Post. premolar	upper	4.3	—	4.0		Lateral incisor	lower	0.3	—	—	
Anter. premolar	upper	4.1	2.5	2.0		Canine	lower	0.1	—	—	
Lateral incisor	upper	3.6	2.5	5.9		Median incisor	lower	0.1	—	—	
Poster. premolar	lower	3.4	7.6	5.2		Third molar	upper	—	6.3	2.6	
Median incisor	upper	2.5	1.3	3.3		Third molar	lower	—	13.9	4.0	

The figures given in this table are percentages. They show that the first lower molar is the most frequently decaying tooth and the first upper molar follows. In the Prague school children the first lower molar is found decayed twice as frequently as in the other Whites compared; the upper first molar is also more frequently found decayed in the children of Prague, while on the other hand the lower second molar in Prague children is not found as frequently decayed as in the Whites of other regions. In Zulus the second molars decay very frequently.

The remaining teeth do not show any important racial peculiarities in these respects. In the four groups under consideration we see that the lower incisors and the upper and lower canines are the best preserved teeth in the whole set.

On the whole it may be said that decay of teeth with regard to race shows no very important differences as to the types of teeth decaying, but does show great discrepancies with regard to frequency of decay, and to the number of decayed teeth in individuals. The Whites show the worst conditions.

The following tables give the total number of decayed permanent teeth at each age in Whites and Negroes, the number of individuals

TABLE 20. TOTAL NUMBER OF PERMANENT TEETH AND OF DECAYED PERMANENT TEETH AT EACH AGE
(WHITE BOYS PRAGUE)

Age	Number of Cases	Upper Jaw			Lower Jaw		
		Number of Permanent Teeth	Number of Decayed Permanent Teeth	Per Cents of Decayed Teeth	Number of Permanent Teeth	Number of Decayed Permanent Teeth	Per Cents of Decayed Teeth
6	21	31	—	—	66	—	—
7	25	82	—	—	109	2	1.8
8	24	142	5	3.5	147	8	4.5
9	30	196	11	5.6	210	20	9.5
10	28	247	13	5.2	255	26	10.2
11	53	543	40	7.3	577	52	9.0
12	66	825	58	7.0	859	89	10.3
13	84	1,106	99	8.9	1,113	129	11.6
14	65	883	88	9.9	881	101	11.4
15	113	1,566	174	11.1	1,559	189	12.1
16	104	1,441	176	12.2	1,446	163	11.2
17	58	809	114	14.1	811	114	14.0
18	13	187	10	5.3	191	28	14.6
19	10	141	35	24.8	144	20	13.9
Totals	694	8,199	823	10.0	8,368	941	11.2

ZULUS

Age	Upper Jaw							
	Males				Females			
	Number of Cases	Number of Permanent Teeth	Number of Decayed Permanent Teeth	Per Cents of Decayed Teeth	Number of Cases	Number of Permanent Teeth	Number of Decayed Permanent Teeth	Per Cents of Decayed Teeth
5	8	26	—	—	12	17	—	—
6	29	105	—	—	13	51	—	—
7	16	84	—	—	22	110	1	0.9
8	34	206	—	—	35	222	—	—
9	31	237	—	—	32	316	1	0.31
10	47	494	1	0.2	43	448	1	0.22
11	31	378	—	—	40	514	1	0.19
12	69	915	2	0.2	51	695	—	—
13	47	653	1	0.15	41	572	—	—
14	32	448	2	0.44	48	674	1	0.14
15	33	467	—	—	26	376	—	—
16	17	241	1	0.41	32	466	9	1.9
17	19	271	—	—	31	455	13	2.8
18	9	143	—	—	30	457	8	1.7
19	12	192	—	—	11	168	6	3.5
20	55	879	21	2.4	44	698	20	2.8
Totals	489	5,739	28	0.48	511	6,239	61	0.98

Age	Lower Jaw							
	Males				Females			
	Number of Cases	Number of Permanent Teeth	Number of Decayed Permanent Teeth	Per Cents of Decayed Teeth	Number of Cases	Number of Permanent Teeth	Number of Decayed Permanent Teeth	Per Cents of Decayed Teeth
5	8	33	—	—	12	30	—	—
6	29	137	—	—	13	64	—	—
7	16	95	—	—	22	125	—	—
8	34	237	—	—	35	233	—	—
9	31	241	—	—	32	324	—	—
10	47	494	3	0.6	43	462	—	—
11	31	380	—	—	40	524	4	0.76
12	69	930	4	0.43	51	698	3	0.43
13	47	658	1	0.15	41	568	4	0.7
14	32	450	8	1.7	48	696	8	1.15
15	33	471	—	—	26	380	2	0.52
16	17	250	1	0.4	32	478	19	3.97
17	19	293	1	0.34	31	471	9	1.91
18	9	142	2	1.4	30	458	13	2.83
19	12	192	—	—	11	169	8	4.73
20	55	875	31	3.5	44	801	20	2.49
Totals.....	489	5,878	51	0.86	511	6,481	90	1.39

with decayed permanent teeth in the two groups compared, and finally a comparative summary of the total number of permanent teeth and

TABLE 21. NUMBER OF INDIVIDUALS WITH DECAYED PERMANENT TEETH

Age	NATIVES OF NATAL AND ZULULAND						SCHOOLCHILDREN PRAGUE		
	Males			Females			Males		
	Number of Cases	Number of Individuals	Per Cents of Individuals	Number of Cases	Number of Individuals	Per Cents of Individuals	Number of Cases	Number of Individuals	Per Cents of Individuals
		With Decayed Teeth			With Decayed Teeth			With Decayed Teeth	
5	8	—	—	12	—	—	—	—	—
6	29	—	—	13	—	—	21	—	—
7	16	—	—	22	1	4.5	25	1	4.0
8	34	—	—	35	—	—	24	6	25.0
9	31	—	—	32	1	3.1	30	12	40.0
10	47	2	4.3	43	1	2.3	28	19	67.9
11	31	—	—	40	4	10.0	53	36	67.9
12	69	3	4.3	51	3	5.9	66	49	74.2
13	47	2	4.3	41	3	7.3	84	71	84.5
14	32	5	15.6	48	6	12.5	65	56	86.1
15	33	—	—	26	2	7.7	113	100	88.5
16	17	2	11.8	32	8	25.0	104	90	86.5
17	19	1	5.3	31	13	41.9	58	56	96.5
18	9	2	22.2	30	10	33.3	13	11	84.6
19	12	—	—	11	6	54.5	10	9	90.0
20	55	14	25.4	44	17	38.6	—	—	—
Total: .	489	31	6.3	511	75	14.6	694	516	74.3

the ratio of decayed permanent teeth. The facts are plain and require but little explanation.

It is seen that at the age of 18 years our school children have more than 10 per cent of their permanent teeth decayed, whereas the Zulus have ten times less, or only from .5 per cent to 1.4 per cent. At the

TABLE 22. DECAY OF PERMANENT TEETH

Group	Sex	Age	Number of Cases	Upper Jaw			Lower Jaw			Total		
				Number of Permanent Teeth	Number	Per Cent.	Number of Permanent Teeth	Number	Per Cent.	Number of Permanent Teeth	Number	Per Cent.
					Decayed Permanent Teeth			Decayed Permanent Teeth			Decayed Permanent Teeth	
Boys of Prague . . .	♂	6-19	694	8,199	823	10.03	8,368	941	11.47	16,567	1,764	10.64
Zulus	♂	5-20	489	5,739	28	0.48	5,878	51	0.86	11,617	79	0.68
Zulus	♀	5-20	511	6,329	61	0.97	6,481	90	1.38	12,720	151	1.18

age of eighteen only 10 to 15 per cent of the Whites have a set of teeth showing no decay, while among Zulus we find that 85 to 94 per cent of the individuals at the age of eighteen still have faultless teeth. The teeth in Zulu girls are twice as frequently found decayed as in Zulu boys. The total ratio of decayed teeth shown in the last part of Table 22 is very significant. Part of the natives examined in South Africa were uncivilized, some were Christianized children of civilized parents, and some were children of Christianized parents. So far as food was concerned, all of them were living under the same conditions as the uncivilized natives.

The teeth of primitive peoples who for many years have lived under civilized or partly civilized conditions through the influence of Whites, such as the Australian natives, are known to show poorer condition than those of the free members of the tribe. In his interesting study on natives of New South Wales Poech states that decay of teeth in the natives is now very frequent while decayed teeth in skulls from former days are rarely found. According to Poech this condition is brought about through changed food and different mode of living, together with the vices of civilization. The writer remembers that he has several times been somewhat surprised to note that the so-called "civilized" Negroes living in towns, especially those living for a long time among Whites, for instance, old colored Mission preachers, teachers, and servants, had worse teeth than the uncivilized natives of the same age.

In his study on the adolescents of the Bulgarian colleges, Wiazemski states that decay of teeth among them is frequent. From his figures the writer calculated an average of 66.7 per cent of decayed teeth in the boys and 54.9 per cent in the girls. Unfortunately, Wiazemski's data are not fully reliable, having been secured not by himself but through inquiries among the students by means of lists. The smaller percentage of decayed teeth in girls is contrary to general observation, for girls usually have more decayed teeth than boys. Magitot (quoted from Baštýř) says that the usual ratio of decayed teeth in boys and girls is 2: 3. The pupils of the Bulgarian colleges answered the inquiries themselves, and the smaller percentage reported by the girls may perhaps be attributed to a certain amount of vanity in the girls, regardless of the fact that in most cases it is impossible for an individual to ascertain accurately how many decayed teeth he has.

V

CONCLUSIONS

1. The main period of eruption of each permanent tooth, or the time during which the majority of a given tooth are erupting (Bean's "physiological standard"), generally covers about two years; but the total period of eruption differs widely with the different dental elements three to eight years). There are no essential differences in this respect among the Whites, except perhaps for a slight precocity in the children of Prague. In general girls are more precocious than boys, and colored races more precocious than Whites. The Filipinos and Zulus have a full set of teeth at eighteen to twenty years of age, and the American Indians but a little later.

2. The beginning and end of eruption in the lower jaw is somewhat earlier and the main period of eruption is a little shorter than in the upper jaw.

3. In general the earlier a type of tooth makes its appearance, the shorter will be its main period of eruption.

4. On the whole eruption proceeds in the right side a little in advance of the left.

5. Teething proceeds gradually but not regularly. There is a sudden leap of acceleration between the eleventh and twelfth years in Whites, and between the ninth and tenth in Zulu boys (eighth and ninth in Zulu girls).

6. Regarding decay of teeth, there is little difference among the groups of Whites compared, and with regard to the types of teeth af-

fectured there are but small differences between Whites and Negroes. But there are considerable discrepancies as to the number of decayed teeth between these groups, the white children having more than ten times as many decayed teeth as the Negroes.

7. Decay of teeth is most frequently bilateral, which indicates internal as well as external causes.

8. At the age of eighteen years there are only 10 to 15 per cent of individuals among Whites in large cities with a faultless set of teeth, while among Zulus 85 to 94 per cent of such individuals were found.

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LEFT-HANDEDNESS

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The aim of this article is, first, to summarize the literature of the subject, and second, to give in brief the results of certain experimental studies in the field. In part it is a condensed statement of data published in another connection (7).

I. LITERATURE ON LEFT-HANDEDNESS

Investigations of the general problem of left-handedness have confined themselves largely to four aspects: (1) the prevalence of left-handedness in normal and sub-normal human beings, and its variation with age, sex, race, etc.; (2) its hereditary nature; (3) its origin and cause, and (4) its relationship to "mirror-writing."

1. THE PREVALENCE OF LEFT-HANDEDNESS

According to Gould (10) 6 per cent of all normal human beings are left-handed. Smith (24) gives the percentage as 5; Lombroso (20) and Jones (12) give it as 4; Ballard (4) states the distribution as 2.7 per cent, while Hyrtl (11) and Baldwin (3) give it as 2 per cent.

It is affirmed by Weber (28), Ballard (4), and Smith (24) and denied by Lombroso (20) that left-handedness is more frequently found among males than females.

Lombroso (20), Audenino (1), Lattes (18) and Smith (24) find left-handedness more frequent among delinquents. Lattes (18) also finds the characteristic more frequent among negroes. Hrdlička (10a) found it in 4 per cent of Apache and 3.6 per cent of Pima Indian children and adolescents.

According to these investigations the distribution of left-handedness among the normal population ranges from 2 to 6 per cent, with 4 per cent as the median. The latter is the more reliable figure, in the writer's opinion, and is confirmed by his own investigations (7).

2. THE INHERITANCE OF LEFT-HANDEDNESS

Wilson (30), Merkel (21), Weber (28), Bardeleben (5), Jordan (14), and Ramaley (22) affirm the hereditary nature of left-handed-

ness, while Gould (10) and Kellogg (17) deny it. There are but two systematic investigations reported, however, which go into the matter with any degree of thoroughness.

Based upon a study of 700 university students, 1,394 colored public-school pupils, and 668 others, Jordan (14) concludes that left-handedness is hereditary to some extent, although he does not imply from the limited data accumulated that the phenomenon follows Mendelian principles.

Ramaley (22), after studying 1,740 cases, concludes that left-handedness is a Mendelian recessive and exists as such in about one-sixth of the population.

3. THE ORIGIN AND CAUSE OF HANDEDNESS

1. *Primitive Warfare*.—Gould (10) and others argue that since the heart is the most vital organ of the body and is located nearer the left side the shield was held with the left hand thus protecting the heart, while the right hand became the spear hand and has consequently acquired a dexterity which has been perpetuated through many ages.

2. *Accident*.—Some argue that a child's handedness is the result of imitating its parents, or that it arises from the mother's constant method of carrying it; the child's hand which is thus left free being exercised more and therefore stronger. The hereditary nature of handedness would invalidate this theory, as would also the observations of Baldwin (2) of his own child in which all such influences were removed and handedness was found to develop spontaneously about the seventh month. Baldwin's findings are confirmed by the observations of Mrs. Woolley (31).

3. *Gravity Theory*.—Struthers and Buchanan (cited by Wilson (30)) argue that since the viscera on the right side of the body (the liver and the lungs) are heavier than those on the left side, this condition places the center of gravity to the right of the anatomical center, thus rendering the use of the right limbs more likely.

This theory implies that left-handedness would be the result of a transposition of the viscera or what is known as *situs inversus*. Cases of transposition are on record which were not correlated with left-handedness. Furthermore left-handed people in general are not "viscerally transposed."

4. *Mechanical Theory*.—Buchanan (quoted by Wilson (30)), argues that full strength cannot be put forth without making deep inspira-

tion and maintaining the chest expanded. Since the viscera of the right side are heavier than those of the left, this so alters the mechanical relations of the two sides of the body that the muscles of the right side act with superior efficacy. To render this inequality greater the muscles of the left side act with a mechanical disadvantage. The evidence adduced to disprove the gravity theory applies equally well here.

5. *Origin of Subclavian Arteries*.—Hyrtl (11) claims that owing to the position of the arteries the blood is forced through the right subclavian artery under a greater pressure than through the left, and as a result the muscles of the right side are better nourished and stronger. Left-handedness is explained by the lower branching off of the left subclavian artery. The negative evidence of visceral transposition just referred to invalidates this theory also; i.e., left-handedness is not necessarily correlated with *situs inversus*.

6. *Greater Blood Supply to one Cerebral Hemisphere*.—This theory is put forth by Leuddeckens (19), Lombroso (20), Judd (16), and others, the essence of which is quoted from Judd (16):

"The two sides of the brain receive their blood supply through arteries which are asymmetrical. Where the blood supply is larger to the left side of the brain, the right hand is naturally developed to a higher degree of dexterity; where the right side of the brain receives the greatest blood supply the person is naturally left-handed."

This theory is invalidated by the presence of the anterior communicating artery, which connects the two cerebral arteries of the brain and forms part of the circle of Willys. As a result the cerebral blood supply is pooled, so to speak, thus making it impossible for one hemisphere to receive a greater blood supply than the other. Furthermore, Cunningham, (8) by measuring the size of twenty-four pairs of carotid arteries as they entered the brain, and comparing the total area of the left carotids with the total area of the right carotids, found no perceptible difference in size between the right and the left.

7. *Cerebral Asymmetry*.—This theory is advocated by Baldwin (3), Lombroso (20), Wilson (30), and is based upon such evidence as is put forth by Boyd (quoted by Wilson (30)). Boyd, for example, examined two hundred brains, weighed each hemisphere separately, and found that almost invariably the weight of the left exceeded that of the right. Lattes, quoted by Jordan (14), notes also that cerebral asymmetry is greater in delinquents, children, idiots, and

negroes than in normal adults. Broca (cited by Wilson (30)), found also that in forty brains the left frontal lobe was heavier than the right.

The objection to this as a theory explaining handedness is that cerebral asymmetry may be the result of handedness and not the cause.

8. *Continuous Variation*.—Bardeleben (5) was the earliest advocate of this theory and contends that the neurological evidence proves that right handedness was and is the primary condition, and that the superior organization of the cerebrum is the result. Handedness from this point of view becomes a continuous variation.

9. *Vision*.—Gould (10) holds that "in about 96 per cent of all infants the right eye is the better-seeing eye and thus compels the right hand to work with it." This, he maintains, is due to the fact that vision develops long before the muscles, in the embryo. His conclusion is, therefore, that handedness is determined primarily by ocular dominance "and only indirectly and partially by heredity."

Stevens (25) and Stevens & Ducasse (27) determined experimentally that in a majority of their subjects objects appearing in the right half of the field of vision of both eyes are uniformly enlarged over objects appearing in the left half of the field of vision. From this they conclude that "by reason of the fact of a marked difference in the space sense of the two halves of the retina, objects in the right half of the field of vision by appearing larger attract the visual attention which in turn leads to grasping movements of the right hand. The hand thus favored by earliest experience acquires a special skill which causes it to be used in all manual acts requiring the greatest precision."

Ballard (4) was the first to point out a fatal objection to this theory by adducing evidence to show that among the congenitally blind one finds about the same proportion of right- and left-handedness as among the sighted. Ballard further points out that Stevens' results were secured from experimentation with adults, and since space perception involves the higher mental processes the implication is, therefore, that a similar experiment upon children would yield totally different results.

10. *Education*.—Wilson (30) says "that the preferential use of the right hand is natural and instinctive with some persons; that with a small number an equally strong impulse is felt prompting to the use of the left hand, but that with the great majority right-handedness is largely the result of education." Kellogg (17) also holds this view.

4. LEFT-HANDEDNESS AND "MIRROR-WRITING"

"Mirror-writing" is a reversed form of conventional, right-hand writing, executed by the left hand backwards, which becomes intelligible when seen in a mirror.

Judd (16), Barr (6), and Sherlock (23) hold that "mirror-writing" is a correlate of mental deficiency. Fuller (9) studied the aberration by inducing it in normal and abnormal subjects. He concludes: "the more the psychological, or higher, parts of the nervous system are disorganized, the more confidently we may expect a left-handed reversed writing to result."

The writer studied "mirror-writing" as it occurred spontaneously in a normal school population of 106,356 children (7). Out of this number, 42 pure "mirror-writers" were found and studied. The results of his investigations, while not purporting to be absolute, prove that "mirror-writing" is not necessarily correlated with mental deficiency; the data rather prove that "mirror-writing" is a characteristic of extreme left-handedness.

II. EXPERIMENTAL METHODS AND RESULTS

The extreme right-handed nature of man's mechanical environment and the necessity of the sinistral's adjustment thereto, render the problem of left-handedness largely one of education. Furthermore, the necessity of working in "right-handed classrooms," and of acquiring facility in a right-handed system of handwriting make the left-handed child's school-tasks unusually difficult.

In its last analysis the educational problem in regard to left-handedness becomes one of accurately diagnosing a child's native handedness at an early age, *i.e.*, at least before he begins to acquire dexterity in the various school subjects. The facts regarding the prevalence of left-handedness and also its hereditary nature would imply that there are all degrees of handedness ranging from extreme right-handedness on the one hand to extreme left-handedness on the other. To force a strongly left-handed child, therefore, to become right-hand is just as wrong as to permit a slightly left-handed person to remain sinistral when he might easily be changed to right-handedness.

It was to this fundamental aspect of the problem, *viz.*, the derivation of a test for diagnosing the native handedness of young children, that the writer applied himself (7).

The field was canvassed for tests which have been used or suggested for the purpose indicated. The dynamometer and the ergograph were

ruled out because the former yields unreliable results and the latter because of its impracticability for school-room use. The Jones' (12) brachiometer tests which measure the ulna and humerus and infer native handedness by the superior bone measurements, were experimentally applied to 123 children in the kindergarten and the first grade. The results, however, gave a distribution of handedness which does not square with the known facts.

In the effort to perfect or devise a reliable test the writer proceeded upon the following assumptions:

1. That a test involving acts of dexterity would be superior to a test of skill or endurance, since such a test would ultimately be given to children between the ages of four and eight years.

2. The desired test, in order to be valid for the purpose in mind, must be relatively accurate when applied to individual cases.

3. The test must be simple, not alone of comprehension by the subject, but in its construction and application; it must be designed to meet the needs of school administrators, teachers and other educational officers.

4. The ability or dexterity tested must closely resemble the principal dexterities called forth in school work and in practical life; at the same time the two must not be identical.

With these basic considerations uppermost in mind the writer decided upon the general plan of trying out certain of the most suggestive tests, in order first, to eliminate the least promising, and second, either to perfect the remaining ones or to glean suggestions for the construction of a new test. The essence of the general method was "to apply certain tests to a large number of children of different school ages, whose handedness was already known quite accurately, and to determine the validity of the tests by the degree or extent to which its results corresponded or correlated with the known facts of the children's handedness.

"The method, while somewhat unique, is simple and resembles very closely the method evolved by society for measuring and indicating temperature. Before the advent of the thermometer the extremes of temperature were known in a general way; the need lay in devising an instrument which would always give, at least approximately, the same indication at the same temperature and at the same time accurately measure any change. In other words, a device was needed which would record a change in direct proportion to the change already known and felt empirically. Of the various

liquids tried out experimentally in the thermometer, that one was finally chosen, of course, which showed the greatest correspondence or correlation with the changes in temperature known empirically.

The method employed, stated in brief, is as follows. A tapping test, a steadiness test, a tracing test (A) were tried out simultaneously upon group 1, 114 boys and girls in the 3rd, 4th, 5th, and 6th grades. The results revealed the superiority of the tapping test. An arm-tapping test and a wrist-tapping test were then tried out simultaneously upon a second group of 116 boys and girls of the same age. These results revealed the superiority of the wrist-tapping test. Finally, a wrist-tapping test, a finger-tapping test and tracing test B were applied simultaneously to a third group of 112 boys and girls of similar ages, with the result that the tracing test B showed a superiority. This test, devised by the writer, was an attempt to embody in a single test the valid characteristics and merits of the tests used in the course of his investigation.

"The apparatus is designed for use with an electric counter or other electric recording devices. It is 20 inches long and 8 inches wide. At one end of the board or arm-rest is inlaid, flush with the surface, a brass plate 8 centimeters square and 4 millimeters thick. The entire surface of the plate is milled in both directions, with grooves 1 m. wide and 2 mm. deep, distance between grooves is also 1 m. The entire surface of the plate presents the appearance as shown in Fig. 1.

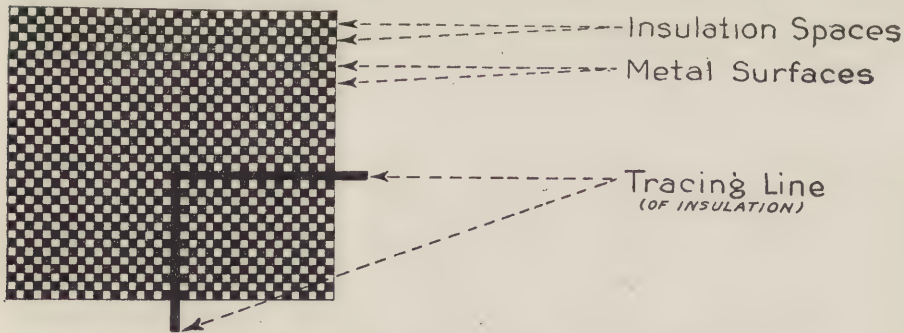


FIG. 1. Diagrammatic appearance of tracing plate in tracing test B.

"The grooves were filled with an insulating material composed of china clay and shellac, which hardens when dry. The entire surface, after sandpapering, presents a perfectly smooth appearance. In the center of the plate is a black line 1 m. wide, forming a rec-

tangle 6 cm. square. This line was made by adding carbon black to the original insulating compounds in order that it should stand out in bold relief from the white lines of insulation.

"The apparatus thus described makes it possible for a subject using a platinum stylus .75 m. in diameter to trace the black line of insulation forming a rectangle without touching any metal surface. This, of course, is the ideal record as far as errors are concerned. A deviation of .25 m. or more will record an error or errors in direct proportion to the number of metal surfaces encountered with the stylus. The entire surface of the tracing plate is perfectly smooth; this makes it possible for the stylus to travel unhindered and unchecked over the entire surface of the plate and in immediate response and direct proportion to the subject's control of movement or lack of it, as the case may be. Furthermore, the alternating metal and insulation surfaces of the plate in both directions make and break contact respectively, so that the number of errors recorded by an electric counter is in direct proportion to the amount of deviation in any direction from the black tracing line.

"Still another feature of the test is important, viz., the similarity between the movements involved in tracing the lines of the apparatus and those involved in handwriting; (1) arm movement, (2) wrist movement, and (3) finger movement."

The errors made by the subject were recorded by means of an electric counter, and the time consumed in making the excursion around the rectangle was kept by means of a stop-watch. The method tentatively adopted for stating the results quantitatively in terms of one coefficient, was to multiply the time-score by the error-score.

The following tables give in brief the results obtained by the author.¹ They justify the conclusion that the test just described reveals all the characteristics of a valid test for diagnosing handedness, since (1) its results correlate perfectly with the known facts and (2) it reveals an increasingly greater difference in the dexterity of the two hands in the lower grades. The writer makes no claim that the test can be used with absolute reliability in every case. All that is claimed is that its use will render the diagnosis of a doubtful case of handedness more accurate and scientific than is possible by any other existing test or method. Furthermore, before the test can be used extensively, norms of ability must be derived for the right hand and for the left hand, at various ages.

¹ See also his "Experimental Study in Left-handedness," Univ. of Chicago Press, 1918.

RESULTS IN CONDENSED TABULAR FORM

TABLE I

COMPARISON IN PERCENTAGES OF DISTRIBUTION OF HANDEDNESS AMONG 100 FIRST-GRADE CHILDREN AND 23 KINDERGARTEN CHILDREN ACCORDING TO JONES BRACHIOMETER MEASUREMENTS

	Ulna			Humerus			Total Arm Length		
	R	L	Amb.	R	L	Amb.	R	L	Amb.
100 first-graders	46	40	14	44	34	22	46	40	14
23 kindergartners . . .	47.8	39.1	13.1	21.7	43.4	34.9	34.8	43.4	21.8

TABLE II

SHOWING THE RELATIVE DIAGNOSTIC VALUE OF THE TAPPING, STEADINESS, AND TRACING A TESTS WHEN APPLIED TO 100 RIGHT-HANDED CHILDREN (Group 1)

Grade	No. of Children Tested	Tapping Test			Steadiness Test			Tracing Test		
		R	L	Amb.	R	L	Amb.	R	L	Amb.
III	25	23	2	0	20	5	0	19	6	0
IV	27	22	4	1	18	8	1	19	7	1
V	26	24	1	1	21	4	1	24	2	0
VI	22	21	1	0	18	3	1	19	2	1
Total	100	90	8	2	77	20	3	81	17	2

TABLE III

COMPARISON OF THE HANDEDNESS OF 105 CHILDREN (GROUP 2) ACCORDING TO THE ARM TEST AND THE WRIST TEST WITH THEIR KNOWN HANDEDNESS

Grade	No. of Children Tested	Known Facts			Arm Test			Wrist Test		
		R	L	Amb.	R	L	Amb.	R	L	Amb.
III	26	26	0	0	23	2	1	26	0	0
IV	26	26	0	0	22	3	1	26	0	0
V	26	26	0	0	24	2	0	25	1	0
VI	27	27	0	0	25	2	0	26	1	0
Total	105	105	0	0	94	9	2	103	2	0

TABLE IV

SHOWING THE RELATIVE DIAGNOSTIC VALUE OF THE WRIST TEST, FINGER TEST
AND TRACING TEST B WHEN APPLIED TO 103 RIGHT-HANDED CHILDREN
(GROUP 3)

Grade	Wrist Test			Finger Test			Tracing Test B		
	R	L	Amb.	R	L	Amb.	R	L	Amb.
III.....	26	0	0	26	0	0	26	0	0
IV.....	27	0	0	27	0	0	27	0	0
V.....	26	0	0	26	0	0	26	0	0
VI.....	22	2	0	24	0	0	24	0	0
Total.....	101	2	0	103	0	0	103	0	0

TABLE V

SUMMARY AND COMPARISON OF DIFFERENCES IN INDICES OF TWO HANDS REVEALED
BY TRACING TEST B

Grade	Right Hand (Average Index)	Left Hand (Average Index)	Difference
III.....	301.5	705.3	403.8
IV.....	354.8	902.3	547.5
V.....	322.2	790.7	468.5
VI.....	338.6	551.0	212.3
Average of Grades III and IV.....	328.7	805.6	476.9
Average of Grades V and VI.....	330.1	675.6	345.5
Total average.....	329.4	742.5	413.1

TABLE VI

SUMMARY AND COMPARISON OF THE AVERAGE TIME AND ERRORS PER TRIAL
REVEALED BY THE APPLICATION OF TRACING TEST B

Grade	Time (In seconds)			Errors		
	Right	Left	Diff.	Right	Left	Diff.
III.....	15.5	20.7	5.2	18.3	32.4	14.1
IV.....	18.6	26.3	7.7	17.7	32.2	14.5
V.....	17.0	26.7	9.7	18.5	29.7	11.2
VI.....	15.0	18.5	3.5	21.5	28.9	7.4
Average of Grades III and IV.....	17.0	23.5	6.5	18.0	32.3	14.3
Average of Grades V and VI.....	16.0	22.6	6.6	20.0	29.3	9.3
Total average.....	16.6	23.2	6.6	18.9	30.8	11.9

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ANTHROPOMETRY

ALEŠ HRDLIČKA

D. SKELETAL PARTS: THE SKULL

The art of measuring the skeletal parts differs in many respects from that of measuring the living and is, in fact, to a degree a field of its own. It is, moreover, a particularly attractive field, for we deal here with specimens that are not masked by other tissues, that can be handled cleanly and easily, and that are mostly completely at our disposal for reference or additional observation.

The most interesting and important part of the skeleton is naturally the cranium, and this has received from the beginnings of anthropology the most assiduous attention. The preoccupation of anthropologists with the skull,¹ particularly since the repeated discoveries of the remains of early man, has in fact been such as to overshadow the study of the rest of the skeleton, with the result that methods relating to research on the long and other bones are with some exceptions less developed and standardized than those on the skull. Yet these secondary skeletal parts are a mine of information of anthropological interest, and as time goes on they cannot but receive more and more attention. The time for a selection of the best methods of measuring as well as observation on the more important of these parts is at hand, and in the final section of this series an attempt will be made in this direction. The present section is devoted mainly to the cranium.

CRANIOMETRY

Efforts at a development of a scientific system of cranial measurements and observations date from well before the beginning of the nineteenth century. The most serious and at the same time successful steps in this direction were, however, those of Samuel G. Morton in Philadelphia in the late thirties of that century, of Anders Retzius in Sweden (1842-1860), and especially those of Paul Broca in France, from the early sixties onward. Broca's system, which was eventually

¹ See bibliographies in "International Catalogue of Scientific literature," in Martin's "Lehrbuch d. Anthropologie," in author's *Physical Anthropology in the United States* (80, Philadelphia, 1919), and in the "Catalogue of the Library of the Surgeon General, U. S. A."

comprised in the "Instructions Craniologiques et Craniométriques" (8°, Paris, 1875), is, with some modifications and additions, in use to this day.

The most noteworthy contributions to the subjects of craniometry and craniology since Broca are those of Topinard,¹ Turner,² Schmidt,³ Török⁴, and finally, Martin⁵; but in this connection due credit belongs to many earlier as well as later well known workers, such as Blumenbach, Meigs, Soemmering, Wentzel Gruber, Quatrefages, Hamy, Geoffroy St. Hilaire, E. Schmidt, Welcker, Flower, Davis, Thurman, Hovelacque, Virchow, and others, not to mention the most recent or still living, such as Hervé, Ranke, Schwalbe, Gustaf Retzius, Sergi, Matiegka, Le Double, Boule, etc.

The total results of all this work on the skull are not only a great mass of data from all parts of the world, but also an elaborate and profuse technique of measurements. Many of these measurements are now, however, of little more than historical value, having been replaced by others or abandoned. Of what remains, the main part has been standardized by the International Anthropometric Convention of Monaco.⁶

The cranial measurements that will be dealt with here are essentially those of the Monaco Agreement; but some of those included in the Agreement have since become quite obsolete, while in a few instances it is now possible to make useful additions, so that a simple reference to the Agreement would not be sufficient. The blanks to be given resemble in essentials those employed on the living (pp. 293-5). For brevity, repetition of definitions, etc., will be avoided, author's notes being restricted to such explanations as will assist the student. A number of measurements included call for special instruments which will be described in that connection. No agreement has yet been attempted as to the relative importance and definition of descriptive characters, and what will here be given in that line is of a more or less tentative nature.

Before beginning with either measurements or descriptive terms, however, it will be necessary to give due consideration to several preliminary procedures, some of which are of considerable importance.

¹ "Éléments d'Anthropologie générale," 8°, Paris, 1885.

² Challenger Reports, Part 29, London, 1884.

³ "Anthropologische Methoden," 12°, Leipzig, 1888, 336 pp.

⁴ "Grundzüge einer systematischen Craniometrie," 8°, Stuttgart, 1890.

⁵ "Lehrbuch der Anthropologie," 8°, Jena, 1914.

⁶ Republished in this journal, 1919, II, No. 1, 50 et seq.

Preparation of Specimens.—Before a series of crania (or bones) can be submitted to measurement or examination, the specimens must be not only well *cleaned*, but also carefully *repaired*, which is interesting work and at times calling for not a little ingenuity. For repair, about the most suitable cement is a thick paste made from fish glue, or from Page's liquid glue, with plaster-of-paris and pigment. A box of dry sand in which to place the skulls or bones while the cement is setting will also be required.

The specimens furthermore, must be numbered and catalogued, otherwise there would inevitably be confusion. The method of numbering is immaterial, so long as the numbers do not duplicate others in the collection. The number, tribe, locality, and sex are marked with indelible ink in the most convenient location, which in the skull is perhaps the antero-inferior angle of the left parietal; and all specimens of one kind in the collection are marked in the same place. If the bone is scaly or too rough, a small parallelogram is covered neatly with oil paint and the mark made on this.

*Sexing.*¹—In adults, the determination of sex, from the skull alone, while generally offering few difficulties to the well-trained observer, is not equally easy in all races, or in all individuals.

A typical masculine skull differs in practically every feature from

¹ The most important contributions to this subject (outside of the various textbooks on Anatomy and Anthropology) are:

Bartels (P.), "Ueber Geschlechtsunterschiede am Schädel," Thes., Berlin, 1897.

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Manouvrier (L.), "Sur la grandeur du front et des principales régions du crâne chez l'homme et chez la femme," *Assoc. Franc. p. l'Avanc. d. Sc.*, 1882.

Mantegazza (P.), "Dei caratteri sessuale del cranio umano," *Arch. p. Antrop.*, 1872, II, 11.—"Studii di craniologia sessuale," *Arch. p. Antrop.*, 1875, V, 200.

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the typical feminine one. It is larger on the whole, and in all its components it is heavier, and all its muscular insertions as well as other features are more strongly marked or developed. But in no human group is there any regular, precise line of demarcation between the male and female characteristics, taken individually or even collectively. In every lot we find male skulls which in some or all of their features are less masculine than the average, and similarly there will be female skulls that in some or all of their parts approach the masculine. Instead of a sharp dividing line we have therefore more or less interdigitation, as a result of which in certain cases the sexual identification of a specimen with all our efforts remains uncertain. In rare cases, even, a female skull may show more pronounced masculine characteristics than some of the less well developed male crania, and vice versa, which may lead to errors in identification.

On the whole it may be said that an experienced and careful observer will have little if any difficulty in correctly identifying over 80 per cent of the crania, in which there is neither the lower jaw nor any other part of the skeleton to assist him; that this proportion will approximate 90 per cent where a well-preserved lower jaw is present; and that it will reach over 96 per cent where we have the whole skeleton. But out of each hundred there will remain one or two skeletons which, even though complete, will show such indefinite sexual characteristics that it will be impossible to identify them as either male or female with certainty.

Given a skull for sexual identification, the observer notes first the size of the vault as well as that of the face; a large size speaks normally for a male and a small size for a female. The features observed next, and in the order named, are the supraorbital ridges, the mastoids, the zygomæ,¹ the occipital crests, the lower jaw, the palate and the teeth, the facial "physiognomy," and the base of the skull.

The supraorbital ridges are on the average decidedly more developed in the males than in the females. If we should characterize them as we do in practice by the terms "traces," "slight," "moderate," "medium," "pronounced," and "excessive," the male skulls will show ridges from moderate to excessive, while the female skulls will be restricted to those of from traces to moderate. Pronounced or excessive ridges do not occur in females, nor are ridges that could be characterized as only "traces" to be found in adult males. But we may have "slight" ridges in a male subadult or even adult.

¹ Correct grammatical form would be *zygomata*, which however is not euphonious.

The mastoids may be "small," "moderate," "medium," "large," or "excessive." Male mastoids generally range from medium to large, female mastoids from small to medium. Small mastoids do not occur in males nor do large or excessive mastoids occur in females.

The zygomæ may be "slender," "moderate," "medium," "strong," or "massive." They range in males from medium to massive, in females from slender to medium.

The *occipital crests* when well or markedly developed as a rule indicate a male. In females they range from "submedium" to "absent."

The *lower jaw* in the male shows on the average greater size, thickness, and weight as a whole, a higher body throughout, a higher symphysis especially, a broader ascending branch, an angle less obtuse than in the female, and strong condyles. A lower jaw of moderate size and strength, with a low symphysis, a rounded chin (a square chin points to male sex), a relatively low body, only moderately broad ascending ramus, delicate or but moderately strong condyles, and an angle of more than 125° , may safely be diagnosed as feminine.

The *palate* in the male skull is usually larger and appreciably broader, and the *teeth* in the male are on the average perceptibly larger than those in the female.

The "physiognomy" of the face, or the impression that the face with the lower jaw in position makes upon the experienced observer, is a characteristic of considerable importance in sex determination. The average male skull presents a decidedly more masculine physiognomy than does the average female cranium. This is due to a combination of factors which should be briefly enumerated. The forehead in the female skull is usually more vertical than in the male, and smoother; the borders of the orbits in the average male skull are dull, in the average female sharp; the nasal process of the frontal, the nasal bones, the malars, and the upper maxillæ as a whole, are larger and stouter in the male than in the female; and the height of the upper alveolar process, between the nasal aperture and the front teeth, is greater in the male. The nasal aperture, moreover, is less high, often relatively somewhat broader, and more delicately moulded in the female. All this, together with the sexual characteristics of the lower jaw, when present, gives the face a certain expression which is of great help in identifying the sex of the skull. Unfortunately the lower jaw is often missing, and the upper face damaged or affected by senile changes, all of which diminishes or disturbs the sexual expression.

Thickness of the vault, alone, is of no decisive value in sexual identification, for while the bones of the male are on the average slightly thicker, individual thick and massive vaults are encountered in both sexes, especially among primitive peoples.

The *base of the skull* presents a complex of structures which as a whole show stronger development and larger dimensions in the male than in the female. The foramina, too, are in general larger in the male.

Sexual Characteristics of Other Skeletal Parts.—As in the sexual identification of the skull we are often obliged to consult the rest of the skeleton, if at hand, the principal sex determining characteristics of the latter may well be dealt with in this connection.

In detailed examinations we find that every bone in the body offers certain sexual differences. The most important skeletal parts for sexual identification aside from the skull are, however, the pelvis, the long bones, and the larger of the remaining parts.

As to the pelvis,¹ the important sexual characteristics which it presents may conveniently be shown as follows:

	Male	Female
Subpubic arch.....	V-shaped	Broader (approaching U-shaped) with diverging branches
Ischio-pubic rami	But slightly everted	Markedly and characteristically everted
Symphysis	High	Lower
Obturator foramina.....	Large	Smaller, more triangular
Acetabula	Large	Smaller
Greater sciatic notch	Rather close and deep	Wide and shallow
Ilia	High, more upright	Lower, more flaring in upper portion
Sacro-iliac articulations ..	Large	Smaller, more oblique

¹ See (besides the modern textbooks on Anatomy, and Obstetrics):

Emmons (A. B.), A study of the variations in the female pelvis, etc. *Biometrika*, 1912, IX, 33–57.

Hennig (C.), "Das Rassenbecken," *Arch. f. Anthropol.*, 1885, XVI, 161–228 (Bibl.).

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Thompson (A.), "The sexual differences of the foetal pelvis," *J. Anat. and Physiol.*, Lond., 1899, XXXIII, 359–380.

Verneau (R.), "Le bassin dans les sexes et dans les races," 8°, Paris, 1875, 156 pp.

Waldeyer (W.), "Das Becken." 8°, Bonn, 1899, 600 pp.

Zaaijer (T.), "Der Sulcus preauricularis ossis ilei," *Verh. k. Akad. Wet.*, Amsterdam, 1893, 23 pp.

Preauricular sulcus	Infrequent	More common and better developed
Sacrum	Relatively high and narrow	Shorter and broader, more obliquely set, less curved in upper portion; sacro-vertebral angle more prominent
Pelvis as a whole	Strong, heavy, marked muscular impressions	Less massive, smoother
Brim	Heart-shaped	More circular (or elliptic), more spacious
True pelvis	Relatively smaller	More oblique, shallow and spacious, less encroached upon by ischial spines

However, none of the above characteristics are wholly constant, and there are pelves so intermediate that a correct diagnosis of sex from them alone cannot be made with certainty.

As to the *long bones*, those of the male are generally larger and heavier than those of the female and have more pronounced muscular ridges, tuberosities and impressions; but the most important and striking sexual differences lie in their articular extremities, which in the bones of the male are in general both absolutely and relatively larger than in the female. A femur or a humerus with a small head or condyles cannot be masculine, neither can bones with relatively large heads or condyles be feminine. These differences are of great help in sexing the skeleton or individual bones. However there are also intermediary grades of development which might leave us uncertain if we had the long bone only.¹

As to the remaining larger bones of the body, the most important for sexual identification are the sternum, scapulæ, ribs, the spine as a whole, some of the vertebrae such as the atlas, axis, and the fifth lumbar, the patella, the calcaneus, and the first phalanx of the great toe. In general they all show larger size, greater weight and stronger development of muscular attachments in the male; and they present various individual features which differ more or less in the two sexes, such as the relatively longer manubrium in the female, a larger glenoid cavity in the male, etc. Their utilization for sexual identification stipulates naturally a special acquaintance with these various bones.

¹ Consult Dwight (Thos.), "Range and Significance of Variation in the human skeleton," *Bost. Med. and Surg. J.*, July, 1894, 73 et seq.—"The size of the articular surfaces of the long bones as characteristic of sex," *Am. J. Anat.*, 1904, IV, 19-31.

Dorsey (Geo. A.), "A sexual study of the size of the articular surfaces of the long bones in aboriginal American skeletons," *Bost. Med. and Surg. J.*, July 22, 1897.

Even the smaller bones, such as those of the tarsus, may help in this connection.

In addition to the differences due to the general development of bones, various parts of the skeleton occasionally present features as for example perforation of the septum in the humerus, third condyle on the femur, a teres major process of the scapula, etc., which do not occur with the same frequency in the males as in the females; but as they may occur in both, their presence or absence in individual cases is not of decisive value. Furthermore, all the bones of the skeleton when studied in lots will show characteristic sexual differences of anthropometric nature, in absolute dimensions as well as indices; but except in extremes these again are of only secondary value in the case of individual bones.

In subadults, determination of sex is mostly hazardous, nevertheless there are a certain proportion of cases in which it is possible. But as the age descends the difficulties of identification rapidly increase, until when we reach puberty and below, it becomes in general very risky, if not impossible.

Estimation of Age.—A correct estimation of the age of a skeleton is of a much greater medico-legal than anthropological importance; but by mastering the details, for which our science is favorably situated, the anthropologist may occasionally be of substantial aid to legal medicine.

For the anthropologist himself it generally suffices to determine whether the skull or skeleton is subadult, adult, or senile, and his main criteria for these purposes are the state of the basilar suture, that of the epiphyses of the long bones, the stage of dentition, the condition of the teeth and alveolar processes, and the state of the sutures of the vault of the skull.

Of all the marks that the adult stage of life has been reached, the most handy and reliable is the *occlusion of the basilar (basisphenoid) suture*; and the value of this sign is furthermore enhanced by the rarity with which abnormal processes affect this articulation. But the basi-sphenoid articulation may be opened mechanically, through posthumous changes in the bones or through violence, and the student must be on the lookout not to mistake such a condition, which to the unaided eye may simulate very closely the normal suture, for the latter.

The *epiphyses* of the long (and other) bones are normally all united with their diaphyses by the end of the twenty-fifth year. The fol-

lowing figures give approximations to the exact time of synostosis in the different cases, according to modern Anatomies. They again can be of but a restricted use to the anthropologist.

OSSIFICATION (COMPLETED)

	Year		Year
Basilar suture	20-25	Scapula	20-25
Humerus: upper	20-25	Clavicle, sternal end	25
lower	18-19	Sternum	20-25
Femur: upper	18-20		
lower	20-22	Ribs	25
Tibia: upper	20-24	Vertebrae	25
lower	18		
Ulna: upper	16	Atlas	18
lower	20-23		
Radius: upper	17-20	Sacrum (union of uppermost seg-	
lower	20-25	ments)	25-30
Fibula: upper	22-25	Ossa innominata	20-25
lower	19-20	Phalanges	18-20

The eruption of *deciduous teeth* among Whites is generally completed before the end of the third, that of the *permanent teeth* before the thirtieth year of life. Among primitive peoples (possibly even primitive Whites), the process, at least so far as the permanent teeth are concerned, is somewhat speedier, being with few exceptions accomplished by or even before the twenty second year.¹ A full set of teeth in a skull is therefore a good sign that adult life has been reached, or nearly reached; but an absence of one or two third molars may exist in the white, and more rarely even in a primitive man, well into the adult stage, and such teeth may fail to appear altogether. The following table gives the periods of eruption of both sets of teeth among civilized Whites. On account of the length of the period of eruption of the individual teeth the data will be also of but limited use.

ERUPTION OF TEETH, IN WHITES²

1st Dentition	Months	Permanent Dentition ³	Years
Median Incisor, lower	4- 8	First Molar, lower	4- 7
Median Incisor, upper	8-11	First Molar, upper	5- 8

¹ See Suk (V.), "Eruption and decay of permanent teeth in Whites and Negroes, with comparative remarks on other races," AM. J. PHYS. ANTHROP., 1919, II, No. 4, 352.

² After Bean, Bednář, Cherot, Gray, Matiegka and Suk, Roese, Steiner, Vogel, Welcker, etc.

³ Exact order of eruption of permanent canines and premolars is still slightly uncertain.

Lateral Incisor, upper	8-11	Median Incisor, lower	5- 8
Lateral Incisor, lower	12-15	Median Incisor, upper	5- 8
First Molar, upper	9-21	Lateral Incisor, lower	6-10
First Molar, lower	12-21	Lateral Incisor, upper	6-10
Canine, upper	16-24	Anterior Premolar, upper	7-14
Canine, lower	16-25	Canine, lower	8-14
Second Molar, upper	20-36	Anterior Premolar, lower	8-15
Second Molar, lower	0-36	Posterior Premolar, upper	9-15
		Posterior Premolar, lower	9-15
		Canine, upper	9-16
		Second Molar, lower	10-17
		Second Molar, upper	10-17
		Third Molar, lower	15-30
		Third Molar, upper	17-30

A valuable indication as to advancing age is furnished to us by the *wear of the teeth*.¹ In Whites this seldom commences before the thirty-fifth or is marked before the fiftieth year of age, and in many individuals of the more cultured classes it may remain slight up to old age; but among grain-eating, primitive peoples, such as the American Indians, wear may commence even before the adult life has been reached, be very marked at fifty, and reach an extreme grade after sixty-five. Partial wearing, due to peculiar habits, has of course but little value in this connection.

The *obliteration of the cranial sutures* has long been relied upon as a help in estimating the age of the subject, and is useful when taken conjointly with other characters. Under normal conditions, i. e. in subjects who have not been affected by rickets or other generalized pathological processes, synostosis of the bones of the vault does not commence until well after adult life has been reached, and in some individuals some or all of the bones of the vault may remain free until advanced age. On the average, however, we may expect to find some traces of synostosis ventrally about the thirtieth, and dorsally about the fortieth year of life. In view of the difficulties of a proper endoscopic examination, the dorsal signs of obliteration are the only ones with which the anthropologist under ordinary circumstances needs to concern himself. The obliteration here may begin in the posterior third of the sagittal suture, or in the distal portions (below the temporal crests) of the coronal—there are some racial as well as individual differences in this respect. A complete obliteration of the coronal, sagittal, and lambdoid sutures under ordinary conditions is reached

¹ See Broca (P.), *Bull. Soc. d'Anthrop.* Paris, 1879, S. 3, II, 342; *Instructions craniolog.*, etc., 1875, 132.

only in advanced age, after seventy, and in fact is seldom fully accomplished even then. The temporal articulations, with the exception of that with the occipital, are the last to ossify. A complete synostosis of all the articulations of the bones of the vault at any age would justify a suspicion of some abnormality. With ample experience, and taking the condition of the sutures and teeth together, we may correctly estimate the age of the adult subject to within, perhaps ten years.¹

As *signs of advanced senility*, may be named a diminution in weight of the skull and bones, with more or less rarefaction of the bone structure (particularly in the long bones of the lower limbs and the spine); extensive loss of teeth and marked absorption of the alveolar processes; and disseminated marginal exostoses of the lumbar and other vertebrae. This latter condition, although usually looked upon as pathological, is so common in senile skeletons of all races that it may well be regarded as a part of the process of skeletal senile involution.

In addition to the above the vault of the skull may in advanced age occasionally show a more or less marked absorption of the bony tissue (diploë) of the parietals above the temporal ridges, with a consequent bilateral, antero-posterior depression. The lower jaw may in instances be reduced to a mere frail shell, with greatly widened angles; while the upper alveolar process may be completely absorbed and the loss involve even a part of the nasal floor. But these extreme manifestations of senile resorption are of little value as indices of the age of the individual in years.²

¹ See in this connection, Dwight (Thos.); "The closure of the cranial sutures as a sign of age," *Bost. Med. and Surg. J.*, 1890, 389.

Frederic (J.), "Untersuchungen ü. d. normale Obliteration der Schädelnähte," *Z. f. Morph. and Anthropol.*, 1906, IX, 273; 1909, XII, 371.

Parsons (F. G.) and C. R. Box, "The relation of the cranial sutures to age," *J. Anthropol. Inst.*, 1905, XXXV, 30.

Pommerol, (J.), "Recherches sur la synostose des os du crâne," *Bull. Soc. Anthropol. Paris*, 1869, S. 2, IV, 502; and Thèse, Paris.

Ribbe (F. C.), "Étude sur l'ordre d'oblitération des sutures du crâne dans les races humaines," *Thèse*, Paris, and *Rev. d'Anthropol.*, 1885, S. 2, VIII, 348.

Welcker (H.), "Altersbestimmung der Schädel," *Arch. f. Anthropol.*, 1866, I, 113.

Zanolli (V.), "Studio sulla oblitterazione delle suture craniche," *Atti Soc. rom. Antrop.*, 1908, XIV, 13.

² Consult: Allén (Harrison), "On the effects of disease and senility as illustrated in the bones and teeth of mammals," *Science*, 1897, V, 289-294.

Broussé (A.), "De l'involution sénile," 8°, Paris, 1886.

Féré (C. H.), "Sur l'atrophie sénile symétrique des pariétaux," *Bull. Soc. d'Anthropol.*, Paris, 1876, S. 2, XI, 423. (cont'd next p.)

Details as to the time of eruption of the various teeth, of synostosis of the different individual epiphyses and sutures, and of various other secondary changes in the skeleton, need not here be considered.

Identification of Parts.—Given a series of crania, and perhaps other bones, for examination, we frequently find that some of the lower jaws have become detached from the skulls, and various bones separated from the skeletons to which they belong. We may further find individual crania, or even larger admixture, of a different type from that of the rest of the collection. Our object naturally will be to properly fit the stray parts, and segregate the heterogeneous specimens. This once more demands considerable care and experience.

The fitting of the lower jaw to its skull is fairly easy if we have to deal with only a few specimens; but in larger collections, and even in some individual cases where more or less warping of the lower jaw has taken place, the task may be quite difficult. The main guidance of the student will be the fit of the teeth, the fit of the condyles, the color and mottling of the specimens, and various conditions and peculiarities of the teeth. He will find a similar or compensatory wear of the teeth in the two jaws of the same individual; a correspondence of more or less extruded or unworn teeth (especially the third molar) in one jaw, to absence of opposite tooth in the other; a similar staining of or concretions about the teeth; etc. But there may be anomalies in one (especially the upper) jaw for the counterparts of which he would vainly look in the other.

As to other parts of the skeleton, which may be touched upon in this place, we can only hope to establish whether or not a certain bone belongs to a skeleton in question by its fit with other bones in articulation, and by resemblances in color, size, shape, muscular insertions, processes, and peculiarities, with the corresponding bone of the oppo-

Humphry (C. M.), "Senile hypertrophy and senile atrophy of the skull," *J. Anat. and Physiol.*, London, 1890, XXIV, 598.

Le Courtois, "Modifications morphologiques de la voûte crânienne osseuse suivant l'âge et le type crânien," *Bull. Soc. d'Anthrop.*, Paris, 1870, S. 2, V, 607-620.

Pozzi (Senile changes in the skull). *Dict. Encycl. d. Sc. Méd.*, XXII, 492.

Sauvage (H.), "Note sur l'état sénile du crâne," *Bull. Soc. d'Anthrop.*, Paris, 1870, S. 2, V, 576. Also sep., Paris, 1870, 132 pp.

Smith (G. Elliot), "The causation of the symmetrical thinning of parietal bones in ancient Egyptians," *J. Anat. and Physiol.*, London, 1907, XLI, 232.

Thomas (O.), "Notes on a striking instance of cranial variation due to age," *Proc. Sci. Meetings Zool. Soc.*, London, 1886, P. I, 125 pp.

Virchow (R.), "Ueber die Involutionsskrankheit (Malum senile) der platten Knochen, namentlich des Schädels," *Ges. Abh.*, 1856.

site side of the body. With the exception of the atlas we are never in a position to absolutely identify a given stray bone, or even a whole skeleton, with a given skull. Occasionally we find it difficult to even pair or place individual bones; but individual features and measurements help greatly in this direction.

Recognition of distinct racial types in a collection, demands especially careful procedure. The skull of a typical White, a typical Negro, a typical Eskimo, or a typical American Indian, may be readily and reliably identified, wherever found by the expert student; and in a smaller measure this is also true of some other parts of the skeleton. But when it comes to a recognition of crania or bones of mixed-bloods, or of closely related racial types, we face considerable uncertainties. The safest rule in all cases is for the observer to set aside from his series any skull or skeleton concerning the anthropological identity of which he is in serious doubt. He will bear in mind, of course, that among all peoples there exists in every feature a wide range of normal variation.

Determination of Normality.—A normal skull (or a normal bone) is that which has not been modified in shape, size, or any other manner, mechanically or through disease.

Mechanically a skull may be modified through injury, artificial or accidental deformation in life, or posthumous deformation.

Deformations through injury are readily recognizable, and in general are of small importance to anthropology. But extensive injuries of the vault and especially of the face, or injuries followed by serious alterations in the bone, may spoil the specimen more or less for study.

Artificial and accidental deformations in life have been dealt with previously (pp. 190-1), and the observations made in that connection apply essentially also to the skull. The best way to appreciate lesser grades of deformations is to lay the hand snugly over the top of the skull and pass it from before backwards; the sense of touch is even more reliable in these cases than the sense of sight, and will be of much assistance.

Posthumous deformations are fortunately not frequent, but must nevertheless be reckoned with, and that above all in imperfect skulls and with the lower jaw. The degree of such deformation, with or even without fracture, is sometimes remarkable. As a result the vault of a skull may assume extreme steno-dolichocephalic or plagiocephalic appearance, and the arch of the lower jaw be considerably

compressed—conditions which may easily deceive the inexperienced.¹ Posthumous deformations of the long bones may simulate curvatures; in other parts they are immaterial.

Deformations caused by disease² are most commonly those of rickets, or hydrocephalus. Microcephaly, akromegaly, diffuse osteoporosis, and leontiasis ossea, each represent or may produce marked alterations in the shape, size, weight, and individual features of the skull. But recognition of these conditions when well developed offers no difficulties. The bones of the skeleton may be altered through dwarfism, cretinism, giantism, acromegaly, syphilis, inflammations, tumors, osteomalacia, and tuberculosis.

MEASUREMENTS OF THE SKULL

As for measurements on the living, so for those on the skull, the observer needs a well-lighted place and one where he will be least disturbed. He will need ample table space, which, however, may in part be improvised with boards. He should have at hand a camera, a stereograph or some other form of large drawing apparatus, and a mounted prism ("camera lucida"). He will need a suitable stuffed

¹ See Tarenetzky (A. J.), Postmortem alterations and damage of skulls (in Russian) Proc. of the Anthropol. Sect. of the Milit.-Med. Acad. St. Petersburg, 1895, I, 19.

² See Backman (G.), "Ueber die Scaphocephalie," *Anat. Hefte*, H. 112, Wiesbaden, 1908, 219-270 (with extensive bibliography).—Ueber Bathro- und Clinoccephalie," *Ibid.*, H. 140, 1912, 495-571 (Bibl.).

Bogtstra (J. N.), "De Schedel met ingedrukte Basis." Leiden, 1864, 44 pp.

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Davis (J. B.), "On synostotic crania among aboriginal races of man," *Natuurk. Verhandl. d. Wet. t. Haarlem*, 1865, XXII, 59 pp.

Frassetto (F.), "Appunti sulla scafocefalia patologica," *Atti Soc. Rom. di Antrop.*, 1905, XI, 18 pp.—"Appunti sulla trigonoccephalia," *Ibid.*, 7 pp.—"Appunti sulla 'oxicephalia,'" *Atti Cong. Natur. Ital.*, 1907, 8 pp.

Grawitz (P.), "Beitrag zur Lehre von der basillaren Impression des Schädels," *Arch. f. pathol. Anat.*, LXXX, 449-474.

Huschke (E.), "Ueber Craniosclerosis totalis rhachitica und verdickte Schädel überhaupt," 4^o, Jena, 1858.

Knox (R.), "The cranium," *Contr. to Anat. and Physiol.*, repr. fr. London Med. Gaz., 1842-3, II, 6-9.

Manouvrier (L.), "Étude craniométrique sur la plagiocéphalie," *Bull. Soc. d'Anthrop. Paris*, 1883, VI, 526-553. —, and E. Chantre, "La dolichocéphalie anormale, etc.," *Bull. Soc. d'Anthrop. Lyon*, 1886 (repr. 14 pp.).

Pommerol (F.), "Recherches sur la synostose des os du crâne, considérée au point de vue normal et pathologique chez les différents races humaines." Thèse, Paris, 1869, 116 pp.

Virchow (R.), *Gesam. Abh.*, 1856.

leather or canvas ring as skull support. And, as in work on the living, he will need properly prepared blanks.

The specimens to be examined are separated first according to kind, then according to sex, and are then arranged by numbers. All of this facilitates work.

The blanks should be based on the same general principles as those for measurements and observations on the living (see p. 293 et seq.). Separate blanks are required for the skulls and for each kind of bone. To save work these blanks may be printed; or they may be prepared on good sized sheets marked in squares large enough to legibly accommodate the records either in figures or in abbreviations.

Selection of Measurements.—The same general rules that apply in this respect to the living (p. 291) apply also to the skull and rest of the skeleton and need not be repeated here. The skeletal collections, however, are for the most part fully and continuously at our disposal, so that they may be used again and again, serving for a series of studies besides that the object of which was a general description. The student may thus in cases require but a single measurement, or a special observation on a single feature of a skull or a bone, and he will prepare his scheme to suit the occasion.

When the object is a general description of a series of crania (or skeletons), the observer will naturally endeavor to show first those features which are of the greatest importance from the standpoint of race or group; and these are usually the size, shape, and peculiarities of the specimen as a whole, and in its main parts. In the case of the skull, he will therefore measure the principal dimensions of the vault, with its capacity; the main dimensions of the face, lower jaw, palate and teeth; and take notes on the form of the vault, face, nose and orbits. He will add such visual observations as may complete in all essential points the picture of the specimen which he wishes to transmit so that this may be properly conveyed to his fellow workers and used in comparison. The concrete object of the work, as here touched upon, should not be forgotten in the maze of details. A list of measurements and observations used for these purposes by the author, is here given:

Instruments.—Cranimetry, as well as osteometry, has a series of its own instruments. The small sliding compass (c. glissière), the regular spreading calipers (c. d'épaisseur), and the anthropometric tape, are the same as for measurements on the living; but in addition the student will need an outfit for measuring the skull capacity; one

for drawing; a Broca's mandibular goniometer; a transparent goniometer; and instruments for special purposes, such as the occipital goniometer, small sharp pointed calipers, an endocompass, curved brass probe, etc. For measurements on other bones of the skeleton he will need, in addition, the standard osteometric board with a block, a pelviphore, and apparatus for measuring the torsion of the humerus. With a few exceptions, these appliances are described and illustrated in Broca's "Instructions Craniologiques et Craniométriques" (Paris, 1875); in Topinard's "Éléments d'Anthropologie Générale" (Paris, 1885); in Martin's "Lehrbuch der Anthropologie" (Jena, 1914); and in Mathieu's, Collin's; and Hermann's Catalogues of anthropometric instruments. As far as additional description or remarks may be called for, they will be made most suitably in connection with the individual measurements.

Landmarks.—Before proceeding to the description of methods, it will be useful to give a list of the landmarks on the skull and their definitions. We may here conveniently draw on Topinard's and Martin's textbooks and on Cunningham's and other modern Anatomies, which include lists of this nature; but it may be of some advantage to give the terms in alphabetical order, and in a few instances to supplement the definitions.

Alveolar Point (or Prosthion).—The term "alveolar point" has a long priority of usage and no valid reason is apparent why it should be changed. It is the lowest point of the upper alveolar arch, between the median incisors. Broca defined it as the lower extremity of the intermaxillary suture, but occasionally the bone on one side or the other projects slightly beyond the suture, so that the above definition is preferable.

Asterion.—The point of meeting of the temporo-parietal, temporo-occipital and lambdoid sutures.

Basion.—The middle of the anterior margin of the foramen magnum.

Bregma.—The point of junction of the coronal and sagittal sutures.

Dacryon.—The point of junction of the lachrymo-maxillary, fronto-maxillary and fronto-lachrymal sutures.

Glabella.—A point midway between the two superciliary ridges.

Gonion.—Point of the angle formed by the ascending branch with the body of the lower jaw.

Gnathion.—See Menton.

Inion.—The most prominent point of the external occipital protuberance. (Now of secondary importance. In some specimens

the protuberance may be absent; rarely it may be double with a depression between; and in instances it may be wholly replaced by a depression.)

Lambda.—The meeting point of the sagittal and lambdoid sutures. (Often displaced by Wormian or other intercalated bones.)

Maximum Occipital Point.—The point on the squamous part of the occipital most distant from the glabella.

Menton ("Point mentonnière," "Gnathion").—The lowest point in the middle of the bony chin.

Nasion.—The median point of the naso-frontal suture.

Obelion.—A point on the sagittal suture on a line with the parietal foramina. (When both foramina are absent, the point may be estimated by comparison with other skulls.)

Ophryon.—The central point of the smallest transverse diameter of the forehead, measured from on temporal line to the other. (Obsolete.)

Opisthion.—The middle of the posterior margin of the foramen magnum.

Pogonion.—The most prominent point of the bony chin.

Pterion.—The spheno-parietal (or fronto-temporal, when that form exists) articulation.

Subnasal Points.—The lowest point, on each side, on the lower border of the nasal aperture, *i. e.*, the lowest points anteriorly of the two nasal fossae. (If simian gutters are present, the subnasal points are located on the lines limiting anteriorly the floor of the nasal cavity.)

Stephanion.—The point where the coronal suture crosses the temporal line. (Obsolete.)

Vertex.—The summit of the cranial vault.

METHODS.

As with measurements on the living, so with the skull and the rest of the skeleton, our foremost and most binding authority are the International Agreements (q. v., p. 50 et seq.). But as in that case so here the directions may in places be amplified so as to aid the student and prevent misconceptions. More or less obsolete measurements, on the other hand, may well be excluded, for the object of this treatise is to deal with the essential parts, rather than with the entire large field, of anthropometry.

THE VAULT

Maximum length: The maximum glabello-occipital diameter of the vault. Instrument: *c.e.*,¹ any pattern.

Method: As specified by International Agreements (p. 50) and on the living (p. 299).

Maximum breadth: The greatest transverse diameter of the vault above the mastoids and roots of zygomae. Instrument: *c. e.*

Method: As specified by I. A. (p. 50) and on living (p. 300).

Basion-bregma height.—*c. e.*

Method: Place left forefinger in foramen magnum, press ball of finger lightly against anterior border of the foramen, apply one point of compass so that it rests on the lowermost point of the border in the middle and against the finger, apply other point to bregma, and read measurement.

Remark.—The maximum height of the vault is less desirable than the basio-bregmatic, because used by fewer observers, and on account of the not infrequent thickening and ridging of the bone in the sagittal region.

Thickness: Thickness of left parietal, 1 cm. above and along the squamous suture.—*c. e.*

Method: Introduce one branch of compass into the cranial cavity, apply to anterior part of the lower portion of the parietal approximately 1 cm. above the squamous suture, bring other branch in contact with the bone externally, and pass backwards at about the same distance from the sutures, watching the scale of the instrument. Record observed minimum and maximum. These give a mean which is useful for comparison, and which must be taken account of in estimates of skull capacity from external dimensions.

Minimum frontal diameter.—*c. e.* or *c. g.* Landmarks and method as given by the I. A. (p. 52).

Capacity.—This measurement, corresponding closely to the volume of the brain, is one of considerable importance, and as it is also beset with difficulties it demands special attention.

An ideal method of obtaining the capacity would be by some liquid, water or mercury, which could be easily and directly measured; but attempts at such a procedure have met thus far with unsurmounted difficulties due to the porosity of the bones, the numerous canals and foramina, and the sharp processes on the inside of the skull.

The various older methods of measuring cranial capacity may be segregated into five groups, namely:

¹ Compas d'épaisseur.

1. The skull is made impermeable and after that filled with some liquid, preferably water, which is then weighed or measured; or the water is forced into a thin rubber bag until it fills with this the entire skull cavity, after which the liquid is measured. These methods, employed by Broca, Schmidt, Matthews, etc., yield good results, but are too complicated or tedious for ordinary use.

2. The skull is filled with sand or other substances, and this is weighed; the result giving a basis for calculating the capacity. This method, used especially by some American anthropologists of the last century, was not sufficiently accurate, and soon became obsolete.

3. The skull is filled with small, rounded seeds, beads, shot or other substances, and the contents are then measured (Tiedemann, Busk, Flower, etc.). The filling or the measuring (or both) is aided by certain manipulations (tilting, tapping, etc.), but, except the measuring vessels, no implements are required. The method in its numerous modifications is comparatively easy and has other advantages, but the results are mostly not as accurate as desirable.

4. The method invented and regulated by and named after Broca. In this procedure the skull is packed with shot, which is then measured; but both the filling and measuring are aided by certain implements, and every step of the procedure follows definite rules. Among the implements used appears a funnel of certain dimensions, which controls the flow of the shot. The method gives steady results, but can not be used with frail skulls, and the capacity obtained is always larger than actual, the proportion growing with the size of the skull.

5. Welcker's method.¹ In this procedure, which is the outgrowth of the majority of those mentioned, but more directly of that of Broca, the most important part is delegated to the funnel, which, by its size, controls the measuring of the contents of the skull. The mode of filling the skull, so long as efficient and uniform, is immaterial; all that is required is that each worker should, with the aid of a standard skull, find the exact size of the funnel necessary to give him, in measuring, the correct result with his particular method and substance used for the filling of the skull. Any rounded seed or substance can be employed for the filling, as it is possible to completely fill the cranial cavity without using the process of jamming, such as that used by Broca;

¹ *Arch. f. Anthrop.*, Bd. XVI, S. 1 et seq. E. Schmidt, "Anthropologische Methoden," pp. 217-219. A modification of the instruments with a form of a funnel stopper has been proposed independently of the author by E. Landau, *Intern. Centralbl. f. Anthrop.*, etc., 1903, I, pp. 3-7.

this allows the most fragile skull to be measured without any injury. Welcker advocated a funnel large enough to receive all the contents of the skull. The contents of the properly filled skull are emptied into a separate vessel and then 'with one movement is versed into the funnel,' which is open (not provided with any stopper) and held in position vertically and centrally above the graduated receiving vessel. Each new series of measurements is controlled by the standard skull.

The author's method, in use since 1901,¹ is a modification of Welcker's. It is based on the observations, that: (a) The same substance poured through the same funnel with the same rapidity will always give the same, but with different rapidity will give differing, measures; (b) each different substance that can be utilized for the measurement of cranial capacity, flowing through a definite size of funnel and with regulated rapidity, will give different results from those given by any other substance flowing through the same funnel and with equally regulated rapidity. (c) Given the same regulation of rapidity of the flow, there can be obtained, through the proper selection of funnels of different diameter, any measurement, ranging between the minimum and maximum of a substance of medium weight and size, by all the solid substances employable for filling the cranial cavity.

Efficient regulation of the flow of the substance used was obtained by adding to the funnel a movable stopper. By doing this, it becomes immaterial as to with what rapidity, or in what manner, the funnel is filled before opening the stopper. This removes at once all source of error connected with the emptying of the cranial contents, and allows us to dispense with the extra vessel used in measuring the cranial contents in Welcker's procedure. With the funnel closed, the cranial contents are poured into it entirely at the convenience of the measurer.

The apparatus used is shown in Fig. 1. The mode of filling the skull is that used by Flower. To measure the contents, they are emptied directly, in any way desired, into a combination of a zinc vessel (higher than, but otherwise similar to, the standard Broca's double liter) and a removable funnel of 45° dip, with 15 mm. high vertical section, which, for my purpose (using old, dry mustard seed) is 20 mm. in diameter. Immediately below the funnel is a movable disk which acts as its stopper. The disk is attached to a rod which rises along the side of the vessel and above its border, and ends in a lever; by using this lever the disk closes or opens the funnel. A number of extra fun-

¹ Described in *Science*, 1903, 1011-14.

² Published originally in *Science*, 1903, 1011.

nels, of the same dip but of different sizes, are provided, from which to choose if another substance than mustard seed is used for the filling. The vessel with the cranial contents is placed on the top of a 2,000-c.c. graduated glass tube (such as used by Ranke), which is fixed in a vertical position. The zinc vessel is provided with a groove in its bottom, which

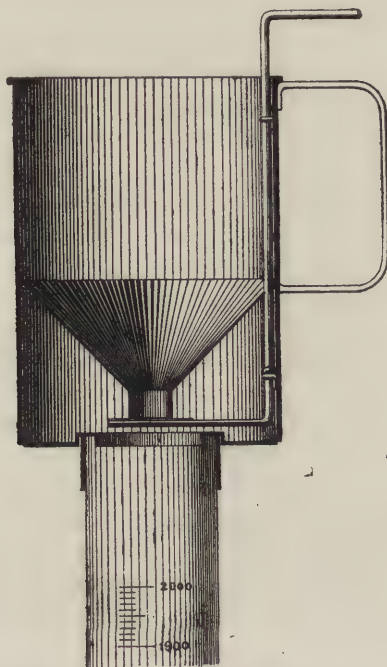


FIG. 1. Hrdlička's apparatus for measuring cranial capacity.

exactly fits the border of the glass, the opening of the funnel being central. Then the lever is rapidly pushed to either side, opening the funnel at once and completely, and the flow left to itself; the level which the seed reaches (determined simply by the eye or, preferably, the careful aid, without any shocks or pressure, of a niveau finder, such as comes with Ranke's tube) is the skull capacity. The measuring part of the capacity determination is thus reduced to a mechanical procedure, which not only makes it easy, but eliminates from it practically all source of error due to personal equation. What the student needs to learn is some method by which a complete and uniform filling of the skull can be effected, and then, working with the aid of standard skulls, choose the proper funnel; the rest is controlled. The results,

always with the condition that the proper use is made of the standard skulls, are as uniform and as near the reality as can be reasonably hoped for.¹

FACE

Menton-nasion height (or "*nasion-menton diameter*").—*C. e.*, or *c. g.*

The distance from menton to nasion, with the lower jaw in place and the teeth in apposition. Note condition of teeth, especially as to wear.²

Alveolar point—nasion height (or "*naso-alveolar diameter*").—*C. g.*, or *c. e.*

Landmarks.—See I. A. (p. 52).

Maximum bizygomatic diameter.—*C. e.*, or *c. g.*

Landmarks, etc.—See I. A. (p. 52).

BASE

Basio-alveolar diameter.—*C. e.* or *c. g.*

Distance between basion and the alveolar point.

Basion-subnasal point diameter.—*C. e.*

Distance between basion and the left subnasal point.

The triangle basion-alveolar point-subnasal point-basion gives the measure of alveolar prognathism, which it is useful to show separately from the facial prognathism.

Basion-nasion.—*C. e.*

Distance between basion and nasion. The angle between the basion-alveolar point line and that from alveolar point to nasion, gives the facial angle, which is the expression of the combined alveolar and facial prognathism.

NOSE

Nasal height.—*C. g.*

Landmarks: As given by I. A. (p. 52).

Method: Measure separately to each subnasal point and record the mean.

Nasal breadth.—*C. g.*

Landmarks and Method: As given by I. A. (p. 52).

¹ The apparatus is not made for the market, but it should not be difficult for any one to have it constructed by following the given directions.

² The question as to whether to allow for the wear of the teeth, when this is present, or not, has not as yet been decided. Until a definite international rule is established, it seems best to record both the actual measurement, and an estimate of what the latter would be with teeth in normal condition.

ORBITS

Orbital breadth.—C. g.

Landmarks and Method: As given by I. A. (p. 53).

Orbital height.—C. g.

Landmarks and Method: As given by I. A. (p. 53).

UPPER ALVEOLAR PROCESS ("PALATE")

Breadth.—C. g.

Length.—C. g.

Landmarks and Methods: Follow I. A. (pp. 53, 54).

LOWER JAW

Bigoniac breadth.—C. g.

The diameter between the most distal points on the external surface of the angles of the jaw.

Method: Use stub branches of the compass. Apply instrument so that the rod rests on each side against the ramus ascendens, while the branches are brought to the most prominent points about the angles of the jaw.

Angle of lower jaw.—Broca's mandibular goniometer.

Method: See I. A. (p. 57).

Note: The angle differs in general on the two sides of the jaw. The logical procedure is to measure the angle on both sides and record the mean.

Height of symphysis.—C. g.

Height of the body of the lower jaw.—C. g.

Maximum thickness of the body of the lower jaw.—C. g.

Landmarks and Method: As given by the I. A. (p. 56).

Note: To obtain the thickness, measure same on both sides and record the mean (if marked difference is found, individual measurements may also be given). The instrument should be held so that the midline of the teeth (antero-posteriorly) corresponds to the midpoint of the rod of the compass between the two branches.

MISCELLANEOUS

Maximum Circumference.—A. t.

Landmarks and Method: As given by the I. A. (p. 55).

Sagittal arc.—A. t.

Landmarks and Method: As given by the I. A. (p. 54).

Note: If subdivisions of the arc are to be recorded, include only those specimens in which there are no intercalated bones at bregma or lambda.

VISUAL OBSERVATIONS

As in the case of measurements, so in that of visual observations, only those will be included in the scheme presented here which are of more than casual importance, and which are needed if the observer is to transmit, or the student receive, a well-rounded impression of the specimen or series examined. On special occasions other observations may become of importance and may then be included in the general scheme, or be carried out separately.

A well organized system of observations renders work easier, more rapid, and more accurate. The main care to be exercised by the student in this connection is that his standards correspond as closely as possible to those generally accepted or understood; and in the report on his work he should invariably include brief but clear explanatory statements as to his use of terms and standards. In recording, all unnecessary details should be avoided. Observation blanks are given below.

The subsequent notes will be of assistance in recording the visual observations. They are given in the same order as followed in the blanks. In recording, for "average," "medium," "ordinary," "normal," use always the sign +; for other characters use abbreviations. Rare features deserve separate and comprehensive description.

NOTES

Pathological: Under this term are included injuries, signs of disease, and pathological exostoses, but no morphological abnormalities.

VAULT: Form from above (Norma superior)—Main types: Ovoid, pentagonal, elliptical—short, medium or long; rotund.

Supraorbital ridges: Trans. slight, moderate; medium (+) (for each sex); pronounced; excessive; neanderthaloid arch.

Mastoids: Small, moderate or submedium, medium (+), large, excessive; peculiarities.

Forehead: High, medium (+), or low; vertical, slightly, moderately or markedly sloping; eminences reduced to one central, or unduly bulging; assymetry (slight or marked); overhanging (hydrocephalus). Metopic suture; metopic ridge.

CRANIA—OBSERVATIONS

Sex—

Cat. No.	Patho- logical	Vault						
		Shape from above (Norma Superior)	Supra- orbital Ridges	Mastoids	Forehead	Sagittal Region	Temporo- Parietal Region	Occiput

CRANIA—OBSERVATIONS (continued)

Sex—

		Sutures				Face	
Temporal Crests	Occipital Crests	Serration	Synostosis (Externally)	Anomalies	Pterions	Prognathism: (a) Facial (b) Alveolar	Orbits

CRANIA—OBSERVATIONS (continued)

Sex—

				Nose			Palate		Base
Orbits	Malars	Zygomæ	Suborbital Fossæ	Nasal Bones	Spine	Lower Borders of Aper- ture	Form	Peculiar- ities	Foramen Lacerum Medium

CRANIA—OBSERVATIONS (continued)

Sex—

			Lower Jaw		Teeth			Special and Anomalies
Depression of Petrus Parts	Styloids	Special	Chin	Peculiarities	Dentition	Wear	Decay	

Sagittal region: Under normal conditions, from side to side, oval, moderately or markedly elevated (keeled).

Temporo-parietal region: Parietal eminences may be indistinct, medium, or prominent; temporal region may be flat, medium, or bulging.

Occiput: Assymetry? Flattening? If undeformed: convex, moderately protruding, markedly protruding.

External occipital protuberance: absent, moderate, pronounced, double; suprainiac fossa.

Temporal crests: State nearest approach to sagittal suture; and whether or not extending over the lambdoid suture on the occipital.

Occipital crests: Absent, slight, moderate, well developed, pronounced.

Sutures: Serration—none, slight, medium, complex (terms based on conditions in average skulls of Whites). Student may also refer to given standards (Broca, Martin), but above terms when used with proper care are quite sufficient. *Synostosis*: State briefly location, and percentage of suture involved. *Anomalies*: Abnormal sutures—give location and extent. Intercalated bones—state briefly location, nature, number; in more important cases give separately size and other particulars.

Pterions: Give type (H, K, X, I); breadth, if special; note epipteric bones; watch for possible anomalous sutures in wing of sphenoid.

FACE: *Prognathism*, facial and alveolar—none, slight, medium (+), above medium, pronounced.

Orbits: Borders sharp or dull; note important anomalies.

Suborbital fossae: Slight convexity instead; or, concavity slight, medium (+), pronounced.

Malars: Size—submedium, medium (+), large; protrusion—slight, submedium, medium (+), marked. Watch for partial and complete malar sutures.

Zygomæ: Strength: Slender, moderate, strong, massive.

Nose: Nasal bones—narrow, medium (+), broad; anomalies.

Nasal spine: Absent (may even be groove instead), diminutive, medium (+), pronounced; when small may be bifid.

Lower borders of nasal aperture: Sharp, dull; simian gutters—moderate or pronounced; subnasal fossae—small, moderate, large. Assymetry.

Palate: Form—elliptic, ovoid, U-shaped, rotund, horseshoe-shaped. Shallow or high. Torus. Marked remnants of or complete intermaxillary sutures.

BASE: *Foramen lacerum medium*: Of evolutionary and developmental importance.¹ May be small, submedium, medium, or spacious.

Depression of Petrous Parts: Of evolutionary and developmental importance.¹ The depression is in relation to the inferior surface of the basilar process. The petrous portions may be slightly above the level of the process, or present a slight, medium (+), or pronounced depression below the plane of the basilar process (as viewed with the base facing the observer).

Styloids: Absent, diminutive, small, medium (+), excessive.

Special: The base offers numerous anomalies, such as pterygo-spinous foramina, defects in the floor of the auditory meatus, basilar fossa, pharyngeal canal, great inequalities of the jugular canals, various anomalies about the foramen magnum (basilar spine, third condyle, pre-condylar processes, rudimentary atlas, accessory articular facets, paroccipital (paramastoid) processes, etc.). In view of the multiplicity of these features it is best to make a special examination for those the observer may wish to report upon.

LOWER JAW: *Chin*—pointed, rounded, square; receding, vertical, slight, medium or marked protrusion. *Peculiarities*: Report extraordinary features of importance.

TEETH: *Dentition*: In children and adolescents note all teeth erupting or erupted. Teeth of first and second dentition must be carefully distinguished. *Wear*: None, slight, moderate, marked, excessive. *Decay*: Note number of teeth lost through or affected by decay. *Special and Anomalies*: Ventral surface of upper incisors may be marked by shovel-shaped concavity with pronounced cingulum, which is characteristic of the American Indian, occurs occasionally in other yellow-brown people, but is rare or absent in other races. In line of dental irregularities and anomalies note crowding, impactions, congenital defects of eruption, supernumerary teeth, and abnormalities of individual teeth. A study of the cusps, as well as that of the form and size of the teeth, is best carried out separately.

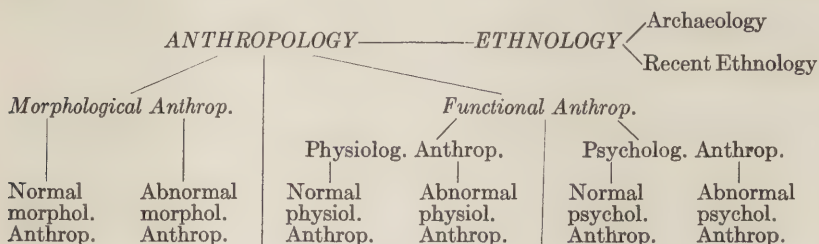
¹ See Hrdlička (A.), "Certain Racial Characteristics of the Base of the Skull," *Science*, 1901, XIII, 309; also *Proc. Assoc. Amer. Anatomists*, 15th Session, *Amer. J. Anat.*, 1901-2, I, 508-9.

LITERATURE

ANTHROPOLOGY IN GENERAL

DIE ANTHROPOLOGIE UND IHRE EINTEILUNG. By Stolyhwo (Kazimierz)—*Korresp. Bl. d. d. Ges. f. Anthrop. Ethnol. u. Urgesch*, 1917, 48. Jahrg., 56.

A short historic consideration of the term anthropology and its different usages is followed by the author's own proposition to divide the field of this science, which is briefly represented by the following scheme:



Our knowledge of these different branches is very unequally distributed; most of the information at hand relates to normal morphological anthropology.

A. H. SCHULTZ

ELEMENTARY BIOLOGY, ANIMAL AND HUMAN. By Peabody (James Edward) and Arthur Ellsworth Hunt. New ed., 12mo, N. Y., 1916, XIV, 212 pp. (The Macmillan Co., \$1.20).

A good introductory to human biology. Appearing originally in 1912, the volume has been reprinted in 1913, 1915 and again in 1916, which shows its usefulness. It covers in a succinct and easily digestible way a large range of topics, the part on "Human Biology" including chapters on General Structure of the Human Body, Micro-organisms and their Relation to Human Welfare, Foods and their Uses, Stimulants and Narcotics, Digestion and Absorption of the Nutrients, Circulation of the Nutrients, Respiration and the Production of Energy in Man, Additional Topics in Human Biology (Anatomy), and Great Biologists. As a text-book for high schools and a book for the young woman as well as man outside of schools, purposes for which it is evidently written and well fitted, the volume could be still further improved by a due anthropological coloring, and by the inclusion of a carefully written chapter or two on the sexual organs and functions.

REPORT ON THE ACADEMIC TEACHING OF ANTHROPOLOGY. By Boas (Franz)—*Amer. Anthropol.*, 1919, XXI, No. 1, 41-48.

The first report of a Committee on Teaching of Anthropology in the United States, of Section H, A. A. A. S. Includes general considerations on the Science of Anthropology, a discussion of the Aims of non-Professional and Professional Anthropological Instruction, and the Requirements of a Department of Anthropology. The report applies mainly to the cultural branches of Anthropology.

THE ACADEMIC TEACHING OF ANTHROPOLOGY IN CONNECTION WITH OTHER DEPARTMENTS. By MacCurdy (George Grant) — *Amer. Anthropol.*, 1919, XXI, No. 1, 49-60.

In 1916 Dr. MacCurdy addressed a letter to 196 of the more important institutions in the United States, which did not have a special department devoted to that branch, asking for information as to existence and extent of teaching in anthropology. Of the number 39 reported courses, in 127 the answer was negative, and 30 did not answer. The positive answers are given in detail. The whole inquiry revealed, on one hand, "the lack of interest in the subject still shown by a few leading universities, such as Johns Hopkins for example"; and on the other the "addition of anthropological courses to the curricula of some of the lesser colleges, more especially to those of State Universities." Another interesting revelation was the range of affinities of the branch. In 15 institutions it was allied to sociology, in 6 with geology, and in 4 with biology; then follow in diminishing degree associations with classical archeology, with history, and with psychology.

Dr. MacCurdy's report is a welcome contribution to the contemporaneous history of anthropology in this country.

EVOLUTION

KÜNSTLICHE ZEUGUNG UND ANTHROPOGENIE. (MENSCHWERDUNG). By Rohleder (H.). Monographien über die Zeugung beim Menschen, Leipzig, 1918.

This elaborate work, dedicated to Haeckel, represents a modern collection of facts and theories relating to man's place in nature. The first part deals with the comparative anatomy of anthropoid apes and man, with fossil man from *Pithecanthropus* to the last findings by Hauser in the Dordogne, and with comparative embryology. The medical part contains the results of blood reactions between ape and man, and a theoretical application to apes of the conclusions of Steinach's experiments on the function of sexual glands. Quite new is the author's discussion of the possibility of artificial fertilization of female anthropoid apes by human sperm, where he even speculates on the conditions of the resulting hybrids. The volume concludes with a brief juridical chapter treating the legal position of such possible hybrids.

A. H. SCHULTZ

SUR LA LOI DE L'ÉVOLUTION IRRÉVERSIBLE. By Petronievics (Branislav)—*Science Progress*, 1919, XIII, 405-419.

The Belgian paleontologist Dollo appears to have been the first to advance the idea that organic evolution is essentially irreversible, that is, that the members of a developing series of organisms having once passed through a given morphological condition will never afterwards exactly return to this previous condition either as regards the structure of the whole animal or as regards that of any organs or parts. Doctor Petronievics expounds and amplified the law formulated by Dollo, giving numerous explanatory instances drawn from the writings of Dollo himself. This evidence appears to indicate rather conclusively that in vertebrates (other classes of animals are not discussed) true reversal of evolution is so remote a possibility that it cannot safely be assumed to have occurred except in the case of slight modifications, particularly those which are limited to changes in size and proportions without sensible alteration in form or structure. The derivation, for instance, of the relatively short arms of man from a type that had previously become long-armed as an adaptation to arboreal habits would not be contrary to Dollo's law, because mere change of proportions would be involved. On the other hand to assume that the human molars in the course of their evolution had passed through a stage in which the crown structure resembled that of the highly specialized, frugivorous teeth of the orang would be contrary to this law, because it would necessitate the return in man to a lost, more primitive, condition in the tuberculation of the teeth. The paper by Dr. Petronievics presents in a clear and detailed manner conclusions which may not meet with universal acceptance in all particulars but which cannot be ignored in dealing with problems of descent. G. S. MILLER

UEBER WESEN UND URSPRUNG DER DOMESTIKATIONSMERKMALE BEI MENSCH UND TIER. By Adametz (L.), *Mitt. Anthropol. Ges.*, Wien, 1918, XXXXVIII, H. 4 and 5, 4-9.

Man is a domesticated animal, and his domestication is of ancient date. Special marks of his domestication are his baldness, in the white race depigmentation of the skin and eyes, various other characteristics, and numerous diseases, such as rickets, caries of teeth, diabetes, etc. Many of the domestication features are those of degeneration, and most of them are hereditary, resulting from changes, not seldom pathological, in the germ plasm. The study of the whole process of domestication in man is self-evidently of great importance, for there is concerned not only the existence but also the possible extinction of races.

DIE KÖRPERFORMEN DES MENSCHEN IN IHRER GEGENSEITIGEN ABHÄNGIGKEIT MIT IHREM BEDINGTSEIN DURCH DEN AUFRICHTEN GANG. By Ruge (G.)—Leipzig, 1918.

The interrelations of the different parts of the human body and the influence of erect walk on them are elucidated in this strictly scientific

work by this late anatomist. He compares anatomical conditions of man with those of other primates. The author finds the main cause for the erect walk of man in the abandonment of arboreal life, which in itself had perfected hand and foot. He attributes this change in habit to nomadic instinct (Wandertrieb).

A. H. SCHULTZ

BETRACHTUNGEN ZUR VERGLEICHENDEN ANATOMIE DER SÄUGETIERKRALLE. By Zietzschmann (O.)—*Gegenb. Morphol. Jahrb.*, 1917, L, 433.

A comparative study of the mammalian claw and of its extreme modifications, the nail and the hoof. Of special anthropological interest is the part dealing with the changes in the claw of lemurs and and in the nail of monkeys leading up to the human form of nail.

A. H. SCHULTZ

IST DIE FRUCHTBARKEIT DER BASTARDE TATSÄCHLICH EIN FÜR DIE SPEZIESZUGEHÖRIGKEIT (BEI MENSCH UND TIER) ENTSCHIEDENDES MOMENT? By Adametz (L.), *Mitt. Anthropol. Ges.*, Wien, 1919, XXXXVIII, H. 6, 59-62.

The author assumes evidently augmented fertility of human mixed bloods in general, as demonstrated, which may be premature; and contends that this is not necessarily a conclusive phenomenon proving the unity of the human species. He cites numerous examples of fertile progeny of parents belonging to two different species and even genera among fishes, birds and mammals, which indicates that in the present state of our knowledge of these matters we can no longer accept the fact of fertility in progeny of two parents as an unequivocal sign of the unity of species of the latter. Fertility in the progeny of mixtures of different human races cannot as yet be regarded as a definite proof that the whole of mankind represents but a single species. The author's inclination is plainly to consider such widely different races as the North European White and the Congo Pygmy as separate species.

THE SIGNIFICANCE OF THE CEREBRAL CORTEX. By Smith (G. Elliot)—*Brit. Med. J.*, June 21, 1919, 758; June 28, 796-7.

Abstracts of author's 1919 three Croonian lectures. His aim in these lectures was to discuss how the cerebral cortex evolved, and how it "acquired its distinctive powers as the organ of intelligence." "In the first lecture emphasis was laid upon the anatomical facts (a) that the cerebral hemisphere has derived from and built upon what in the primitive vertebrate was simply the receptive instrument for small impressions; and (b) that the olfactory tracts, unlike all the other sensory paths, lead directly to the cerebral cortex without the intermediation of the thalamus. The primitive hemisphere, therefore, must have been the instrument whereby the affective aspect of smell was appreciated—that is, it performed the functions with which

the thalamus is concerned for the other senses. Guided by the sense of smell, the behaviour of the primitive vertebrate is brought under the influence of other 'distance-receptors,' which secondarily acquire an intimate relationship with the dominant sense. Specializations of structure and function then develop by the cultivation of these other senses, often at the expense of the sense of smell." After discussing the advancement in development of the brain in fishes, amphibians, and higher vertebrates, by the additional powers of hearing, touch and vision, the author expresses the opinion that the increasing significance of these "found expression in the sudden growth of the thalamus and the development of larger tracts of fibres ascending from the thalamic nuclei into the lateral edge of the pallium, which then suddenly expanded and bulged into the ventricle. The great mass of low-grade pallium, which may be called "hypopallium," thus formed represent the first relatively independent representation in the cortex of the senses of vision, hearing, and touch, at first chiefly of the trigeminal nerve. Then for the first time the cerebral cortex became an instrument whereby these senses played a combined part in controlling behaviour and added their quota to the discriminative side of the animal's consciousness. The reptile thus came to acquire the power of learning by experience from other senses than smell and of correlating the information acquired by touch, vision, and hearing, to perform acts of discrimination in which these several senses took a definite part.

"But this hypopallium was an imperfect instrument; and when it became superseded by the development of the higher mechanism of the neopallium, it (the hypopallium) became converted into [the greater part of the nucleus caudatus, the putamen and the claustrum."

DIE ENTWICKLUNG DES ZAHNSYSTEMS DER SÄUGETIERE UND DER MENSCHEN. EINE KRITIK DER DIMERTHEORIE VON BOLK. By Adloff (P.)—Berlin, 1916.

A critical discussion of the publications by Bolk dealing with the origin of the dental system of mammals. According to Adloff the number of teeth as well as of dentitions diminished steadily during evolution, from the fishes upward to the only two dentitions of mammals. The latter are not, as Bolk assumes, homologous to two successive generations of reptile teeth but correspond according to Adloff to the entire set of teeth with its many rows in low vertebrates. The two authors differ mainly in the interpretation of the same observations.

A. H. SCHULTZ

EARLY MAN

DIE BEURTEILUNG DES REZENTEN UND PRAEHISTORISCHEN MENSCHEN NACH DER ZAHNFORM. By Aichel (O.)—*Zeitschr. f. Morphol. u. Anthropol.*, XX, 1917, 457.

From this detailed treatise on human teeth from a phylogenetic point of view the author concludes that the following are primitive forms of teeth: Incisors without any or with but little developed

tubercles; molars with cusps only, in opposition to those with furrow formation on the crown; molars of the upper jaw with only three cusps; molars of the lower jaw with only four cusps; and teeth with small pulp cavity. Recent man, including all recent and diluvial races, except those of the Neandertal type, has teeth primitive in every respect. *Homo Neandertalensis* shows the most specialized teeth and *H. Krapinensis* the highest specialized pulp cavities. Aichel believes that the oldest findings of fossil man in Europe are not direct predecessors of *H. recens* but specialized types, and that therefore the ancestors of recent man are to be looked for in other parts of the world. The author develops his views on the evolution of teeth in general, which do not agree with Bolk's theory on the same subject. The latter is in Aichel's opinion a hypothesis without proofs.

A. H. SCHULTZ

LES DIMENSIONS DU CANAL VERTÉBRAL LOMBAIRE DE L'HOMME DE LA CHAPELLE-AUX SAINTS. By Anthony (R.)—*Rev. d'Anthropol.*, Mai-Juin, 1918, 192-3.

Author measured directly the lumbar portions of the vertebral canal of the la Chapelle skeleton, about the dimensions of which there was uncertainty, and found them to present considerably larger proportions than in the average man of today. There is no discussion as to the significance of the fact.

DIE UNTERKIEFER DER SPÄTDILUVIALEN FUNDSTÄTTE "HOHLERFELS" BEI NÜRNBERG UND IHRE RASSEN MORPHOLOGISCHE BEDEUTUNG. By Elsner (Friedrich Wilhelm), *Arch. f. Anthropol.*, 1917, XV, H. 5, 313-336.

A detailed, well-illustrated report on four lower jaws from the late paleolithic site of Hohlenfels near Happurg, Switzerland, preserved in the collections of the Society of Natural History in Nürnberg. The jaws, though possibly of a mixed type, show in general more primitive forms than those of any whites of the present day. The chin prominence is reduced; the height of the body at symphysis is subaverage, increasing slightly as we proceed backward; the angles are characteristically rounded, the ascending ramus relatively broad—all of which gives a somewhat pithecoïd aspect to the specimens. In addition, the mandibular canal is very spacious; all four specimens possess a marked *incisura submentalis*; and there are other features of interest about the jaws as well as the teeth.

The nice study is marred somewhat by uncalled for comparisons with Australians; but such ill-founded comparisons are now quite a fashion. What has the Hohlenfels man of say twenty-five thousand years ago to do with the present-day Australian? Even more successful and not more illegitimate comparisons might have been made with the jaws of the actual Eskimo.

DAS SCHÄDELFRAGMENT DER SPÄTDILUVIALEN FUNDSTÄTTE "HÖHLERFELS" BEI NÜRNBERG UND SEINE RASSEN-MORPHOLOGISCHE BEDEUTUNG. By Klaatsch (H.), pub. by F. Elsner—*Arch. f. Anthrop.* 1919, XVII, 1-11.

A description of a diluvial skull fragment, by the late H. Klaatsch, is published by Elsner. The skull, of which only the right parietal and temporal bone and part of the squamous portion of the occipital bone are present, was found near Nürnberg. The detailed craniometric study leads the author to place the "Höhlerfels" skull near the Neandertal type but certain modifications make a mixture with the Aurigiacman probable. (The mandible and some bones of the extremities of the "Höhlerfels" skeleton have been published previously.)
A. H. SCHULTZ

DIE PHYLOGENETISCHE ENTWICKELUNG UND AUSBILDUNG DES MENSCHLICHEN KINNES. By Walkhoff (O.)—*Arch. f. Anthrop.*, 1919, XVII, 12-43.

A critical review of the different theories on the evolution of the bony chin in modern man forms a large part of this article. The symphyseal region of the mandibles of diluvial man and of anthropomorphæ is described and compared with the lower jaw of living races. Based upon this and upon the study of median sections and X-rays of adult mandibles, as well as upon sections of fetal mandibles, the author formulates the theory that during the reduction of the human mandible its lower median portion remains under the influence of the genioglossus, geniohyoideus and digastricus muscles, thus forming a prominent chin.
A. H. SCHULTZ

MAN'S VARIATION: OSTEOLOGY

O METOPISMO E O EVOLUCAO DAS FORMAS CRANEANAS. By Mendes Corrêa (A. A.)—*Portug. Médico*, 1919, V, No. 5, repr. 7 pp.

Metopic Portuguese skulls indicate that metopism may be due to more than one cause. Only two or three of the specimens found showed a greater capacity and frontal development than the average ("métopisme supérieur"); the remaining four or five were small, but little "frontalized," and in general rather infantile ("métopisme inférieur"). None of the latter specimens were high, the majority being in fact plainly platycephalic. These facts seem to indicate that in these specimens there was a premature arrest of development. . . . No relation was observable between metopism and cephalic index.

DER CANALIS CRANIO-PHARYNGEUS PERSISTENS BEIM MENSCH UND BEI DEN AFFEN. By Schultz (A. H.)—*Gegenb. Morph. Jahrb.*, 1917, L. 417.

This canal which perforates the base of the skull in the midsagittal plane from the pituitary fossa to directly in front of the synchondrosis sphenoccipitalis is a persistent hypophyseal canal, which normally

disappears early in embryonic life. The author found this canal patent throughout its entire extent in 4 out of 771 human adults and partly obliterated in the same material in 8 per cent, and in juvenile skulls in 31 per cent. Among adult primates it was missing in Hapalidæ, but was found complete in 5.2 per cent in Cebidæ, in 3.3 per cent in Cercopithecidæ; in Anthropoidæ this percentage increases to 40 and in man it drops again to only 0.5. To call this canal an atavism, as often found, is not at all justified.

The persistency of this canal in man was found to be correlated with an abnormally great pituitary fossa, as expressed in the high figures of the module of Hrdlička (1899).

A. H. S.

LA VALEUR MORPHOLOGIQUE DE LA ROTULE CHEZ LES MAMMIFERES. By Vallois (Henri)—*Bull. et Mém. Soc. d'Anthrop.* Paris, 1917, VIII, 1-34.

The patella is usually regarded as a sesamoid bone which by virtue of the mechanical importance of its function has assumed large size and definite form. In two papers¹ Bertha de Vriese has maintained that this interpretation of the patella is incorrect, and that the knee is actually part of a primordial *intermedium cruris*, a bone which is assumed to have formerly extended from knee to foot, but which has never been observed as a complete element. It probably disappeared in the hypothetical Proamphibia, and has since then been represented by the two extremities only, one forming the patella and the other forming part of the astragalus. Vallois subjects the argument of de Vriese to detailed criticism based chiefly on a study of the patella in the Primates. He concludes that there is no reason to abandon the usual conception of the sesamoid origin of the patella through a mechanical process the early stages of which may be seen in the "rotule supérieure" or upper patella, a structure which occurs in different stages of development in various mammals. In discussing Vallois's paper, Marcel Baudoin (pp. 31-34) asserts that both de Vriese and Vallois fail to recognize the importance of the fact that in addition to the upper patella there exists a series of lower patellæ distributed between the true patella and the anterior tuberosity of the tibia. These bony elements, he says, cannot be explained by the sesamoid hypothesis, but they are easily understood if they are regarded as vestiges of a former peduncle joining the patella to the tibia. According to this view the knee-cap is neither a sesamoid formed in the tendon of the quadriceps muscle, nor the proximal end of a vanished leg bone, but the detached head of a structure analogous to the olecranon. Whatever its origin may have been the patella is now so closely associated with the function of walking that differences in gait appear to be reflected in its form. The tables published by Vallois indicate that among the primates the breadth-height index of the

¹ *Bull. Acad. Roy. Med. Belgique*, Ser. 4, Vol. 23, March, 1909, pp. 155-219. *Bull. et Mém. Soc. Anthropol. Paris*, Ser. 6, Vol. 4, 1913, pp. 306-369.

patella is less in the saltatorial forms, greater in the heavier arboreal forms and in man. The agreement of the human patella in this respect with that of the anthropoid apes is regarded as evidence in favor of the arboreal origin of man: "The ancestral form could have been neither a runner, nor particularly a jumper, but a climber analogous to the living great apes though much less specialized than they."

The hypotheses of de Vriese and Baudoin are weakened by the fact that they both require the assumption that the bone which we now know as the mammalian patella had originally a function different from that which it fulfills in all of the mammals and their immediate forerunners of which we have definite knowledge. The sesamoid hypothesis on the other hand is direct and simple: the knee-cap was originally brought into being by the action of definite mechanical forces in a region of friction and pressure.

G. S. MILLER

KIEFERMESSUNGUN AN IDIOTEN. By Faesch (Emanuel)—*Schweiz. Vierteljahrsschr. f. Zahnheilk.*, Zürich, 1917, XXVII, 137-193; 1 pl. and numerous tables.

Doctor Faesch has measured the palate and examined the dentition in 112 idiots and 127 normal individuals. From a study of the data thus obtained he arrives at results somewhat at variance with those of previous writers. His conclusions are that the palatal dimensions of idiots show, in comparison with those of the mentally normal, a relatively slight but characteristic deviation, consisting in an inclination toward less height, greater breadth and shortened palate-length. There is a tendency toward stronger development of these peculiarities in the more severe cases of idiocy. The deviations from the normal type are most marked in cretins, mongoloids, and myxoedemics, whose diseased condition can be certainly attributed to derangement of the internal secretions. In the teeth of idiots the tendency toward abnormality is about twice as great as in those of the mentally sound. Here again the underlying cause is probably connected with derangements of the internal secretions.

The paper is clearly written and well arranged. It contains an account of the literature and a bibliography of 78 titles. The subject has a general biological interest as furnishing an example of definite modification of the skull by conditions independent of the application of any mechanical force to the skull itself.

G. S. MILLER

VARIATION: TEETH

DIE STRUKTURVEREINFACHUNG DES DRITTEN UNTEREN MOLAREN. By Cohen (Th. E. de Jonge)—*Schweiz. Vierteljahrsschr. f. Zahnheilk.*, 1917, XXVII, No. 3, 127-137.

The evolution of human denture can not be regarded as ended. It still proceeds, and that by regressive processes which tend to sim-

plification of the denture as a whole as well as to that of individual teeth. The results are a tendency towards the elimination of certain teeth, and, in the lower jaw especially, towards diminution of cusps. The reduction applies to both the buccal as well as the lingual cusps. The author has examined a large series of molars and gives interesting data as to the tendency towards fusion and disappearance of the separate cusps.

DU TUBERCULE DE CARABELLI CHEZ L'HOMME AUX PÉRIODES PALÉOLITHIQUE ET NÉOLITHIQUE DANS L'ANTIQUITÉ ET AU MOYEN ÂGE. By Jeanselme (E.)—*Bull. et Mém. Soc. d'Anthrop. Paris*, 1917, VIII, 121-134.

Man is no longer regarded as a being separate from the animal kingdom, but human anatomy continues to be studied as a subject apart from the anatomy of mammals, a practice which sometimes leads to curious results. Thus the occasional presence in man of a normal mammalian character which human teeth share with those of many other animals has recently been mistaken for an evidence of hereditary syphilis.

In practically all mammalian upper molars which, like those of man, show a tendency toward hypsodonty combined with a tubercular crown-structure, there is usually, or at least frequently, some trace of a cingulum or ridge bordering the base of the crown on the lingual side of the teeth. From this cingulum are often developed tubercles accessory to those which enter into the primary plan of the crown. Usually these accessory tubercles have no obvious mechanical function, but occasionally, as for instance, in a few rodents, they become large enough to contribute an essential part to the grinding surface of the tooth. They may be found throughout the primates and lemuroids, in most of the ungulates, in many rodents and in some carnivores. In human teeth these structures appear to have been first noticed and described by G. Carabelli, in 1841. For the most part they have been regarded as meaningless anomalies, but during the past few years it has been supposed that they have such a direct connection with hereditary syphilis that, even in the absence of all other symptoms, their presence could be taken as diagnostic. Doctor Jeanselme shows conclusively that no such pathological interpretation is possible. He points out that the tubercles of Carabelli are present, though often as mere rudiments, in about the same proportion of subjects, 30 to 40 per cent, dating from before the prevalence of syphilis in Europe as in those of recent times; that they occur in primates other than man; and finally that among 32 French soldiers in all of whom the tubercles were well developed the Wasserman reaction was positive only twice.

G. S. MILLER

VARIATION, SOFT PARTS

BEITRAG ZUR KENNTNIS DER GESICHTSMUSKULATUR DER SUNDANESER. By Koster (J. J.)—*Gegenb. Morph. Jahrb.*, 1919, L., 551.

A detailed description of the facial muscles of one adult male native

of Java and of one of Madura. Both specimens show a number of primitive conditions. These two cases are merely placed on record in this paper; for any general conclusions the material is naturally too small.

A. H. SCHULTZ

THE FACIAL MUSCULATURE OF THE JAPANESE. By Kudo (Tolu-yasu)—*J. Morph.*, 1919, XXXII, 637-673.

Author's material consisted of five Europeans (males), three Chinese (males), and fifteen Japanese (ten males and five females), all adults. The results of his painstaking study are summarized as follows:

1. The platysma which takes part in the structure of the cheek region consists, for the most part, in the Mongolian of a continuous muscle plate, the same as in Europeans. Well-developed platysma fibers which extend in a line drawn from the corner of the mouth to the outer ear opening or course above it have been found in five Japanese and two Chinese.

Most of the cases of the aberrant platysma strands, which rise orbitotemporalward and may often reach the zygomaticus or orbicularis oculi, have been observed in the Japanese (eleven out of fifteen half faces), and constantly in the Chinese. There is nothing special to contribute with respect to the frequency of the neck portion in the Mongolians.

The M. mandibulo-marginalis has been found twice in fifteen half faces of the Japanese. It is rarer in Europeans.

2. The muscles of Mongolians (Japanese and Chinese) which function as dilators of the mouth appear to be less divided than in Europeans. In the Mongolians the muscles are generally difficult to distinguish from one another, are more extensive and coarser. In the Mongolians the triangularis fibers, for the most part, are spread out, fan-shaped, along the margin of the jaw.

The M. risorius is generally present in Mongolian (lacking twice in fifteen Japanese half faces, never in Chinese, in 43 per cent in negroes, in 33 per cent of in seventeen Hottentots). The M. transversus menti also occurs frequently (without exception in fifteen Japanese and three Chinese, in 60 per cent in Europeans, 30 per cent in the negro). In Mongolians, as a rule, the three parts of the quadratus labii superior fuse into a single plate; further, the caput zygomaticus, constantly present in Mongolians, is distinguishable with difficulty from the neighboring muscles.

3. The musculature around the eye is more strongly developed in Mongolians (especially in Chinese), as I have found by comparison with five Europeans. The bundles radiating at the lower median part are especially strongly developed. The separation of the muscle from its surroundings is usually not definite (connection with the M. zygomaticus and M. quadratus labii superioris).

4. The epicranii shows no noteworthy difference between Japanese and Europeans. The junction of the muscle of either side along the

median line in the region of the middle third of the muscle follows the same plan as that in the European (and also in the negro).

5. Likewise, I find no special difference in the muscles in the vicinity of the conch in my material. Nevertheless, it might be desirable to undertake an investigation of the ear muscles in more extensive material, in which eventually a racial difference might be discovered.

It may be noted that the *M. transversus nuchae* is more frequent in the Japanese (negro 58 per cent, Japanese in half of the cases of half faces, Europeans 37 per cent). The *M. auriculo-frontalis* was found six times in the Japanese (fifteen half faces) and once in the Chinese (three half faces).

6. In spite of a considerable difference in form of the nose, nothing noteworthy has been found with respect to the muscles.

7. The facial musculature as a whole in the Mongolians appears to show only minor individual differences.

In general, the facial musculature of the Japanese presents a more primitive type than that of the European. It is to be noted, however, that in certain parts, the reverse holds.

VARIATION: RACIAL

ZUR ANTHROPOLOGIE DER JUDEN. By Kollmann (J.)—*Korr.-Bl. d. D. Ges. f. Anthrop. Ethn. & Urg.*, Jan.-Mar., 1917, 1-5.

A collective review of the results of anthropometric studies by various authors, extending to upwards of 2,200 Jews from various countries. Conclusions: "The European Jews have originated from the polymorphous division of the white race. They represent a sub-race. Among them can be found long, medium as well as short skulls, and also long as well as short faces. The soft parts of the face, however, possess definite and unmistakable peculiarities which so far have eluded measurement.

"The brunet Jews are found predominantly about the Mediterranean, the blond Jews among the Nordic peoples and the Slavs. Both have seemingly descended from an unknown single ancestral group. Asia Minor may be accepted as their old home.

"The black and yellow Jews belong to the black and yellow races and have racially nothing in common with the European Jews."

LAPPENSCHÄDEL AUS MUONIOVAARA. By Pösch (Rudolf)—*Mitt. Anthrop. Ges. Wien*, 1919, XLVIII, H. 6, 53-59.

Description of a male Lapp skull. The specimen is brachycephalic (C. I. 84.6) and low; the orbital index is 82.9, the nasal 52.1. In these as well as other respects it is a typical Lapp cranium. Following the description of the skull the author discusses the physical characteristics of the Lapps as a whole. They have more or less Mongolic as well as Finnic blood, but their original derivation remains uncertain. The view that they may be descendants of an earlier European race that together with the reindeer once occupied more southern regions, is unconfirmed.

THE PEOPLING OF THE PACIFIC. By Brown (J. McMillan)—*The Mid-Pacif. Mag.*, Honolulu, Feb., 1919, 133-8.

Whence came the various racial strains that peopled the Pacific? The author, basing his views on cultural criteria, particularly the presence in Polynesia of megalithic monuments, concludes "that a masculine migration accustomed to the art of great stone building came into Polynesia by way of Japan and Micronesia, and by the same route came the empire builders [he assumes the presence of former "empires" in Micronesia] that gave the imperial tendency to the Polynesians. . . . We may take for granted that the organizing element that developed royalty and conquest and government in the Polynesian groups came from the colder north, and not from the hot tropical lands away to the west." Racially he regards the Polynesians as "Caucasoid," with only a trace of Negroidism in their nose and lips, and does not attempt the difficult task of substantiating his notion that they have "nothing Mongoloid in their features."

THE PAN-PACIFIC RACIAL PROBLEM. By Rea (Geo. Bronson)—*The Mid Pacif. Mag.*, Honolulu, Feb., 1919, 139-43.

Author marshals an alarming lot of figures relating to the absolute as well as relative prospective increase in numbers of the yellow-brown peoples, with special reference to the Japanese; and asks rightly: "What is the solution of the problem?" and "has the East the right to adhere to customs and practices which promote abnormal fecundity, and then demand the further inalienable right of invading and settling in other lands whose inhabitants have imposed artificial restrictions on their powers of reproduction?"

The facts that the world tends rapidly towards over-population, and that the relative proportions of the races are changing to the disadvantage of the Whites, loom up as steadily increasing dark clouds on the horizon, and will unquestionably before long command very serious scientific as well as political attention. The neo-Malthusian doctrines should not be inculcated to white peoples alone.

PRIME LINEE DI UN 'ANTHROPOLOGIA SISTEMATICA' DELL' ASIA. By Giuffrida-Ruggeri (V.), *Arch. p. l'Anthrop. & Ethol.*, 1917 (publ. 1919), XLVII, repr., 8°, 87 pp.

In attempting an anthropological classification of the Asiatic peoples the author has undertaken a large and difficult task. Moreover he has undertaken this under the disadvantage of being obliged to use heterogeneous data, which do not always apply to pure groups, and which, due to differences in methods and other sources of error, may in cases be quite misleading. Nevertheless, he has made a very creditable beginning and further progress should be easier. His classification is based on stature, and the cephalic and nasal indices. The very important item of hair has been drawn upon only partly and the equally important one of physiognomy could not be utilized at all for want of uniform observations.

The unreliable nature of some of the data is well illustrated in the case of the Igorots whose nasal index is given as 99.8, which, if correct, would place the tribe among the negroes. As a matter of fact, the pure or Bontoc Igorots, as can well be seen from their portraits published by Bean, Worcester, Jenks, and others, have a nose which could not possibly give any such elevated index. But the Benguet Igorots who are admixed with the Negrito show as a consequence of this admixture a shorter and broader nose. Yet even in these the average nasal index does not reach a height such as that included in the tables under consideration.

Asiatic peoples must needs be largely restudied by modern methods and uniformly trained observers. This is equally true of the western as of the eastern and southern parts of the continent. Asia is essentially a continent of mixtures, but the elements of these are well known and should never be lost sight of. The fundamental components are the Whites, Yellowbrowns, and the Negrito, with a slight infusion of the Negro in Asia Minor and the Arabic Peninsula; and all larger groups as Hindu, Malay, Chinese, Japanese, Turks, Semites, etc., are merely various mixtures of two or more of these fundamental races, pure remnants of which are few in number.

In quoting from Martin's text-book, the author points out a series of errors and misprints, which with others in the book should be borne in mind by those who use the volume.

CONTRIBUTIONS TO THE ETHNOGRAPHY OF MICRONESIA. By Matsumura (Akira)—*J. Coll. Sci. Tokyo Univ.*, 1918, XL, 174 pp., map, 35 pl.

The South Sea Islands, now under Japanese occupation, fall into three geographical divisions—the Mariana, Caroline and Marshall groups. With the inclusion of British Gilbert or Kingsmill Islands, they constitute Micronesia. In 1915 the University of Tokyo dispatched a party of scientists to these islands, among whom was the author as anthropologist, and the present memoir is a report on his observations, which are essentially ethnological. The natives found show a mixture of races. As seen from the illustrations, the predominant stratum is that of the Yellow-browns (Malay, Polynesian), with which, particularly in the Pelew islands, there is an admixture of Melanesian and Negrito. In the words of the author, "we would not be justified in treating the Micronesians as forming one and the same stock with the Polynesians, this negative conclusion being confirmed by the study of their ethnographical as well as their physical characteristics. But we cannot believe that racial intermixture has taken place in the East and West Caroline Islands to the same degree, for, from what we saw, they are different both ethnographically and somatologically. The West Carolines are situated nearer to the Philippine Islands and New Guinea than the East Carolines, and the natives of the former seem to possess more racial characteristics in common with the natives of the Philippines and New Guinea than

the East Caroline Islanders. This is true not only ethnographically but somatologically as well, inasmuch as not a few natives in Yap and Palau are frizzy haired and brachycephalic. Ethnographically, Polynesian or Melanesian elements are in evidence in the East Caroline group, but not so prominently as is the case in the Western group mentioned above. Of the physical characteristics of the East Caroline Islanders, the same observation may be made. In short, the natives of Micronesia are an intermixture of various neighbouring tribes."

ANTHROPOLOGIA ANGOLENSE: II BI-N'BUNDO, ANDULOS E AMBUELAS-MAMBUNDAS. By Mendes Corrêa (A. A.)—*Arch. Anat. & Anthropol.*, Lisboa, 1918, IV, 283-321.

Second instalment of observations on the natives of Angola, Portuguese Africa, by Fonseca Cardoso. The tribes are far from homogeneous. Recognizable are Bantu, Fula, Zulu, Bushmen and other elements. The mean stature of the better represented tribes ranges in males from 147 to 170 cm., the cephalic index from 72.5 to 77.1, the nasal index from 94.5 to 99.6.

ABNORMAL CLASSES. COMPARATIVE HUMAN PATHOLOGY

PARTIELLER RIESENWUCHS VERBUNDEN MIT DOLICHOCEPHALIE. By Bauch (B.)—*D. Med. Woch.*, 1919, XLV, 745.

Description of a newborn child with an extremely prominent left frontal bone. The greatest length of the head, when measured to the most prominent point of the right frontal bone is 11.5 and when measured to the left frontal bone 14 cm.; the greatest breadth is only 8 cm. No fontanelles and but few sutures could be found by palpation. This great asymmetry in the forehead is in the author's opinion partial acromegaly (?).

A. H. SCHULTZ

BEGLEITWORTE ZU MEINER STATISTIK ÜBER DIE VERBREITUNG DER ZAHNFÄULE BEI DER SCHWEIZERISCHEN SCHULUGEND. By Brodtbeck (Ad.)—*Schweiz. Vierteljahrschr. f. Zahnheilk.*, 1917, XXVII, No. 2, 61-70, 1 map.

This highly interesting report gives the results of over twenty-six years of observations on the subject of caries among the country folk of all parts of Switzerland. The observations apply essentially to school children, and the conditions found are shown very plainly on the map which accompanies the article. The best conditions are seen to exist in the southern and southeastern parts of the country where the people are wholly pastoral and agricultural and live simple hardy lives; and they are worst in the northern and especially northeastern districts which are the main industrial parts of Switzerland. In some of these latter districts not a child was found with an entirely healthy set of teeth, while in the southern districts the proportion of children with wholly normal and healthy denture reached 15 per cent. The distribution of conditions would also seem to agree roughly

with the distribution of nationalities, but the influence of this factor may be only apparent, the real causes being the habits, food, and general hygienic state of the diverse groups of people, which may, of course, differ more or less according to nationality regardless of occupation.

NOTE ON A DEFORMED SKULL FROM SIWAH OASIS. By Hooton (E. A.)—Harvard African Studies, Cambridge, 1918, II, 101-104.

A deformed skull from the Siwah Oasis now in the collection of the Peabody Museum of Harvard University shows the remarkable ability of the human organism to adapt itself to abnormal functional conditions. The skull is very scaphoid with a post-coronal annular constriction. The sagittal, temporo-parietal, and temporo-sphenoidal sutures are entirely obliterated. The entire facial skeleton is bent back beneath the frontal region. Owing to a permanent disarticulation of the mandible new glenoid fossæ have been formed in the temporal bones mesialward from the anterior portions of the roots of the zygomatic processes. The mandibular condyles are reduced to atrophied stumps.

The author attempts to explain these and other peculiar features displayed by the specimen as the result of adaptations necessitated by changes in the cranio-facial base due to premature ossifications of certain cranial sutures.

E. A. H.

DIE ZAHNKARIES EINST UND JETZT. By v. Lenhossék (M.)—*Arch. f. Anthrop.*, 1919, XVII, 44-66.

Caries of the teeth existed as early as the end of the diluvium; it was found by the author in a skull of the period from Nagysáp, Hungary. The frequency of caries increases steadily; on a series of skulls of the fourth century it was found in 83 per cent of the cases; in one of the eleventh to thirteenth century in 86 per cent, and in recent skulls 90 per cent. The often claimed sexual difference in frequency of caries is not found, but the author's findings confirm that the upper teeth are more often infected than the lower ones.

A. H. SCHULTZ

TEETH AND THE NATION.—An editorial in the *British Medical Journal* (Sept. 20, 1919, 386), calls again attention to the general bad state of, and to the importance of a proper attention to, the teeth of the population at large, and quotes a recent report on the subject of the British Dental Association, and of the "Departmental Committee on the Dentists' Act." The latter ends as follows: "In conclusion, we wish to state very strongly that in our opinion the State cannot afford to allow the health of the workers of the nation to be continuously undermined by dental neglect. Steps should be taken without delay to recognize dentistry as one of the chief, if not the chief, means for preventing ill health, and every possible means should be employed

for enlightening the public as to the need for conservative treatment of diseased teeth. The dental profession should be regarded as one of the outposts of preventive medicine, and as such encouraged and assisted by the State. Treatment should be rendered available for all needing it." The Dental Association recommends the following: (1) Dental treatment for expectant mothers and for children up to 5 years of age; (2) inspection and treatment of all children of school age; (3) treatment for all adults whether entitled to National Insurance benefit or not; (4) dental treatment as an essential element in the cure of tuberculosis and venereal disease. There should be established a Dental Section of the Ministry of Health, under a dental director.

ANTHROPOMETRY AND METHODS

BEMERKUNGEN ZU DER HAUTFARBENTAFEL. By Fritsch (Gustav)—*Mitt. Anthrop. Ges. Wien.*, 1916, XVI, H. 4-5, 183-5.

Notwithstanding the fact that we already possess several separate sets of color standards for use in connection with anthropometry, there is still room for much improvement in this direction, and Prof. Fritsch makes a further attempt. His colors, derived in part from actual tests, are arranged on racial grounds in 7 subdivisions, each of which contains 7 shades. The latter are painted in durable oil colors on strips of special paper, and to facilitate correct determination the strips are surrounded by a dark field. The whole forms a small case which can easily be carried in the coat pocket. These cases can be procured from W. Pfund, Motzstrasse 55, Berlin, W., Germany.

STANDARD MEASUREMENTS FOR SCHOOL CHILDREN. By Kerr (James)—*School Hygiene*, 1918, IX, No. 1, 5-15.

The author advocates the establishment for all year-groups of childhood, of standard values for height and weight. These values, he believes, "can only be determined when the deformed, diseased, and retarded, are excluded." After giving several series of data, which show the retarded condition of children of the poorer classes, he sums up his communication (which relates especially to conditions in England) as follows: "This paper suggests the usefulness of certain datum lines in public health matters. The real import of an infantile mortality of 99 is only to be fully appreciated, if some fiducial mark, say 45, has been set up as representing natural biological wastage of infant life, and so too with the heights and weights of school children. As a nation we should not accept quietly the difference in physique between primary and secondary schools. We must make all our children pass into the one national standard of physique, and no longer regard as inevitable the inferior physique of artisans, and superior of professional classes, knowing that the difference is largely due to social failure and an index of national inefficiency. . . . Having settled on standards, the next point for practical usefulness is to correct the annual rate of change down to monthly or even weekly coefficients, allowing for

seasonal variations. . . . The actual height or weight is not as valuable as the rates of change in either. The real index of nutrition then which is awaited is this corrected increment of growth for each month of the year, varying from high positive to actual negative with season, perhaps influenced by temperature, a little by race and social condition, but comparatively less still by the actual magnitude of height or weight, so that any normal ranges of variation in these have been neglected as of little moment for this important coefficient—the real indicator of present condition. Once definite scientific inquiry is pursued, even with temporary standards, such as here suggested, the measure to work to, sets an ideal before the eye, and holds up a mode of estimating sanitary and environmental effects on the individual and defects in his condition, which will materially contribute to the national welfare of those who come after. It will indeed later afford in some things a measure of the impending social reconstruction."

IDENTIFICATION OF INDIVIDUALS BY MEANS OF FINGERPRINTS, PALMPRINTS AND SOLEPRINTS. By Mairs (G. Tyler)—*Sci. Monthly*, VII, No. 4, 1918, 299-319.

An extended and useful review of the subject, giving particular attention to the recent publication of Dr. H. H. Wilder. No original contribution.

UEBER RELATIVE SCHÄDELMASSE UND IHRE ANWENDUNG. By Szombathy (Josef)—*Mitt. Anthropol. Ges. Wien*, 1918, XLVIII, H. 4-5, 177-207.

A dissertation on a method originally advocated by the author in 1879, of giving the cranial and facial measurements in their relation to the cubic root of the cranial capacity. The formula is

$$\frac{\text{Measurement (in cm.)} \times 100}{\text{Capacity (in c.c.)}}$$

The results, arranged about a mean-column on squared paper, permit the view of the value of the different measurements from a new angle, which has its advantages. But the method, to enter into extensive use, should have been developed before the current methods have taken such deep roots.

To facilitate the determinations, Dr. Szombathy has made up extensive tables which will soon be published as a separate part of the *Mitteilungen*.

NOTES

DIVISION OF ANTHROPOLOGY AND PSYCHOLOGY, N. R. C.—As a part of the plan of reorganization of the National Research Council, there have been formed a series of divisions covering the various branches of Science and including that of Anthropology and Psychology. This Division met for organization on October 20, 1919; and it was agreed that "in view of the fact that it is hoped the Division of Anthropology and Psychology will command the interests of all the Sciences dealing with the humanities, the Division be organized as a unit." Its membership is as follows:

Anthropologists: Society representation: American Anthropological Society—Franz Boas, R. B. Dixon, J. W. Fewkes, A. L. Kroeber, Berthold Laufer, Clark Wissler; members at large: A. Hrdlička, A. M. Tozzer, and P. E. Goddard.

Psychologists: Society representation: American Psychological Association—James R. Angell, Raymond Dodge, W. D. Scott, C. E. Seashore, E. L. Thorndike, C. M. Whipple; members at large: S. I. Franz, L. M. Terman, and M. F. Washburn.

The Chairman of the Division is Dr. W. V. Bingham, psychologist, Carnegie Institute of Technology.

It was moved and adopted "that the members of the Division be requested to formulate problems or procedures, to indicate favorable problems, methods of proceeding with these problems, probable period of investigation, and costs, and send the copy of the same to the Chairman of the Division not later than December first."

INSTITUT INTERNATIONAL D'ANTHROPOLOGIE

As a further step towards the establishment of an "International Institute of Anthropology at Paris," MM. Ives Guyot and H. Weisgerber, respectively the Director and Sub-Director of the École d'Anthropologie, have addressed the following letter and documents to anthropologists:¹

PARIS,
October, 1919.

Honored Colleague:

In the circular letter addressed to the anthropologists of the allied and associated nations by the École d'Anthropologie of Paris on November 20, 1918, the École announced its intention to take the initiative in a plan which intends to group, orient, and centralize the efforts of those who occupy themselves with the problems of anthropology. The following points were submitted for consideration:

The foundation of an "International Institute of Anthropology," with a permanent central Bureau the principal functions of which would be:

¹"Pub. de l'École de l'Anthrop.," 8°, Paris, 1919, 24 pp.

To organize general periodical reunions;

To promote mutual relations;

To facilitate the work of investigators, especially by centralization of addresses, together with information as to the specialties and principal scientific activities of each member;

To centralize publications, books, pamphlets, reviews and Journals of the groups belonging to the Institute;

And, to organize anthropological research on general plans ("plans d'ensemble")-

The initiative of the École having been received with marked favor by the anthropologists of the allied and associated nations, the organization and functions of the Institute will be discussed in a preparatory congress which will be held in Paris in 1920.

In order to facilitate the work of this congress and to furnish basis for discussions, the Professors of the École have prepared reports on the principal questions that will be of interest to the Institute, each covering his particular field. Following its liberal traditions, the École presents these individual points for suggestions which we beg those addressed to communicate to us at their earliest convenience.

The Institute should be the fruit of collaboration of all, and the preparatory congress could not meet with success without the various points, critiques, and projects being soundly thought over and coördinated in advance, to be eventually harmonized in an establishment which all agree in regarding as necessary to the progress of the science of Anthropology.

(Signed) YVES GUYOT
(Le Directeur),

DR. H. WEISGERBER
(Le Sous-Directeur)

Following the above letter are brief articles on "Ethnologie" by Georges Hervé; "Anthropologie Zoologique" by P. G. Mahoudeau; "Anthropologie Préhistorique" by L. Capitan; "Recherches Ethnographiques" by L. Capitan; "Enquêtes Anthropologiques" by G. Papillault; "Anthropologie Anatomique" by R. Anthony; and "Linguistique" by Julien Vinson. These different articles present in brief the "desiderata" of each branch of Anthropology. Those addressed are asked to freely offer their suggestions.

ANTHROPOMETRIC SURVEY IN ENGLAND.—In the first of a series of lectures on "Problems of British Anthropology," at the Royal Institute London, Professor Arthur Keith emphasized the need for an anthropometric survey, for it is not the total number of the population which is most important, but the total number of fit individuals in the population. The Conjoint Board of Scientific Societies has appointed a committee to prepare a scheme of survey and the committee "is of the opinion that such a survey is a matter of national importance and that it can be carried out by machinery already in existence" if an advisory council is set up and a bureau established to deal with the statistics as they are collected.—*J. Amer. Med. Ass.*, 70, 1020 (April 6, 1918).

ANTHROPOMETRIC DATA ON ENGLISH RECRUITS.—The anthropologists of England are urging a speedy preparation and publication of the vast data on measurements of recruits collected under the now abolished Ministry of National Service. Imperfect as they are, these data may nevertheless prove to be of much practical value and it is to be hoped that the English authorities will facilitate their early utilization. It is highly desirable that similar prompt publication be urged also for the American measurements.

THE PARIS SCHOOL OF ANTHROPOLOGY.—The announcement of its 1919-1920 course by the École d'Anthropologie, Paris, shows the following lectures and conferences: *Regular weekly lectures:*

GEORGES HERVÉ—Ethnology (Heredity and Crossings, i. e. blood mixture).

L. MANOUVRIER—Physiological Anthropology (Physical Training. Physiology of the walk).

P. G. MAHOUDEAU—Zoological Anthropology (Scientific Spirit and Transformism in the eighteenth century).

ADRIEN DE MORTILLET—Comparative Ethnography (Burials in Course of Ages).

L. CAPITAN—Prehistoric Anthropology (The Dolmens; Architecture and Art among the Protohistoric Races).

F. SHRADER—Geographic Anthropology (Normal and Abnormal Relations of Modern Civilization with Natural Laws).

G. PAPILLAUT—Sociology (Individualism).

S. ZABOROWSKI—Ethnography.

R. ANTHONY—Anatomical Anthropology (Morphotopical Determinism in Biology).

J. VINSON—Linguistic.

Special lectures or courses:

J. L. COURCELLE-SENEUIL—Prehistoric Human Migrations.

ED. CUYER—Esthetic Anthropology.

L. DUBREUIL-CHAMBARDEL—Anatomic Variations of the Extremities.

P. GODIN—Practical Applications of Pedagogic Anthropology.

G. PAUL-BONCOUR—Lie among the Criminals.

According to *Science* (Nov. 14, 1919, 457), Dr. O. Olsen proposes to conduct a small Norwegian anthropological and botanical expedition to Siberia next spring. His plan is to go to the Yenisei valley north of Krasnoyarsk, and to push thence into the less known regions immediately to the east.

The New Jersey Court of Chancery has decided (*Davis v. Davis*, 106 Atl., 644.) that a marriage can be annulled where one of the parties concealed the fact that he had chronic tuberculosis.

Dr. Louis Montané, professor of Anthropology at the University of Havana since that Chair was established in 1899 has been given leave of absence for one year, and Dr. Aristides Mestre has been placed in charge of the course for the year.

Dr. E. W. Hawkes of the Army Medical Museum was appointed in July Adjunct Professor of Anthropology at the University of Texas. In addition to lectures in anthropology and ethnography Dr. Hawkes plans to conduct a physical survey of the student body, and later this work may be extended to include the very interesting racial population of the state, including native whites, negroes, and Mexicans.

Dr. Hrdlička has been made a Corresponding Associate Member of the "Sociedad Ecuatoriana de Estudios Historicos Americanos."

ALEXANDER MACALISTER ✕ The death is announced, in the earlier part of September, of Alexander Macalister, Professor of Anatomy in the University of Cambridge for the last thirty-six years. Prof. Macalister was born in Dublin in 1844 and died at Cambridge after a long illness. He was one of the foremost anatomists England has produced, and was also actively interested in physical anthropology. Connected with his Department was the Anthropometric Laboratory of the Cambridge University (in charge of Duckworth), and his large collection of crania, among which many neolithic from the British Isles, is of great value.

AN APPEAL FOR HUMAN EMBRYOLOGICAL MATERIAL

In 1906 I observed certain malformations of the human shoulder-blade, and in contributions to current literature I have given them the collective name "the scaphoid type of scapula," and pointed out some of its possible significance.

Probably the most important observation connected with this type of scapula in man is its age incidence, that is to say, it occurs with great frequency among the young and with relative infrequency among the old. There appear to be two possible explanations of this fact: either (A) one form of shoulder-blade changes into the other during development and growth, or (B) many of the possessors of the scaphoid type of scapula are the poorly adaptable, the peculiarly vulnerable, the unduly disease susceptible—the inherently weakened of the race.

I have attempted to answer these questions by seeking evidence in various directions and one of the most important of these has been a study of intrauterine development of shoulder-blades. My investigations in this direction have been limited by the material at my disposal, which has been inadequate for a definite solution of this phase of the problem. I am, therefore, appealing to physicians for fetuses in any and all stages of human development.

It is desired that the material, as soon as possible after delivery, be immersed in 10% formalin, sealed in a suitable container, and be forwarded to my address; charges collect. Due acknowledgment will be made to those forwarding material.

WILLIAM W. GRAVES

727 METROPOLITAN BLDG.,
ST. LOUIS

AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY

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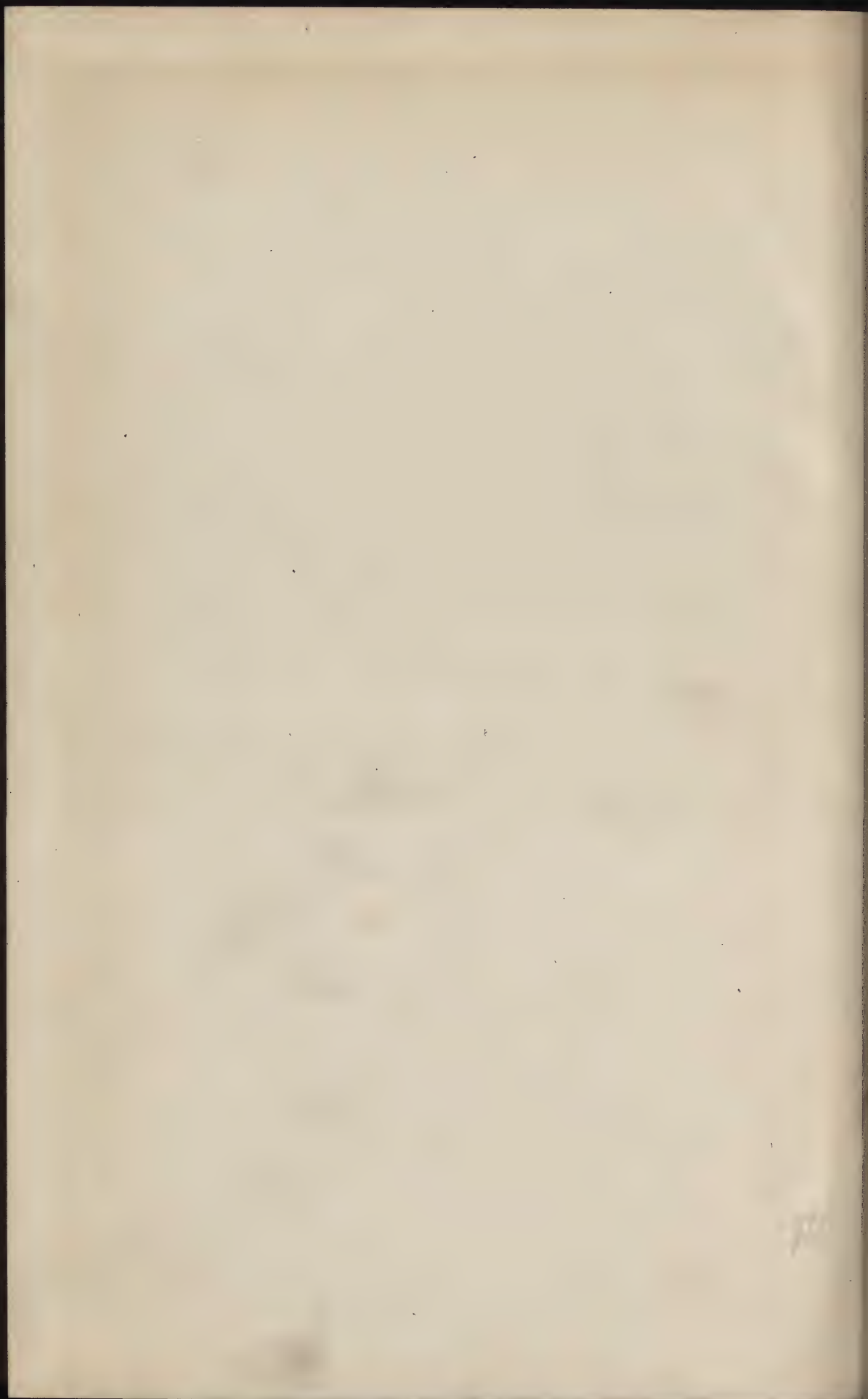
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